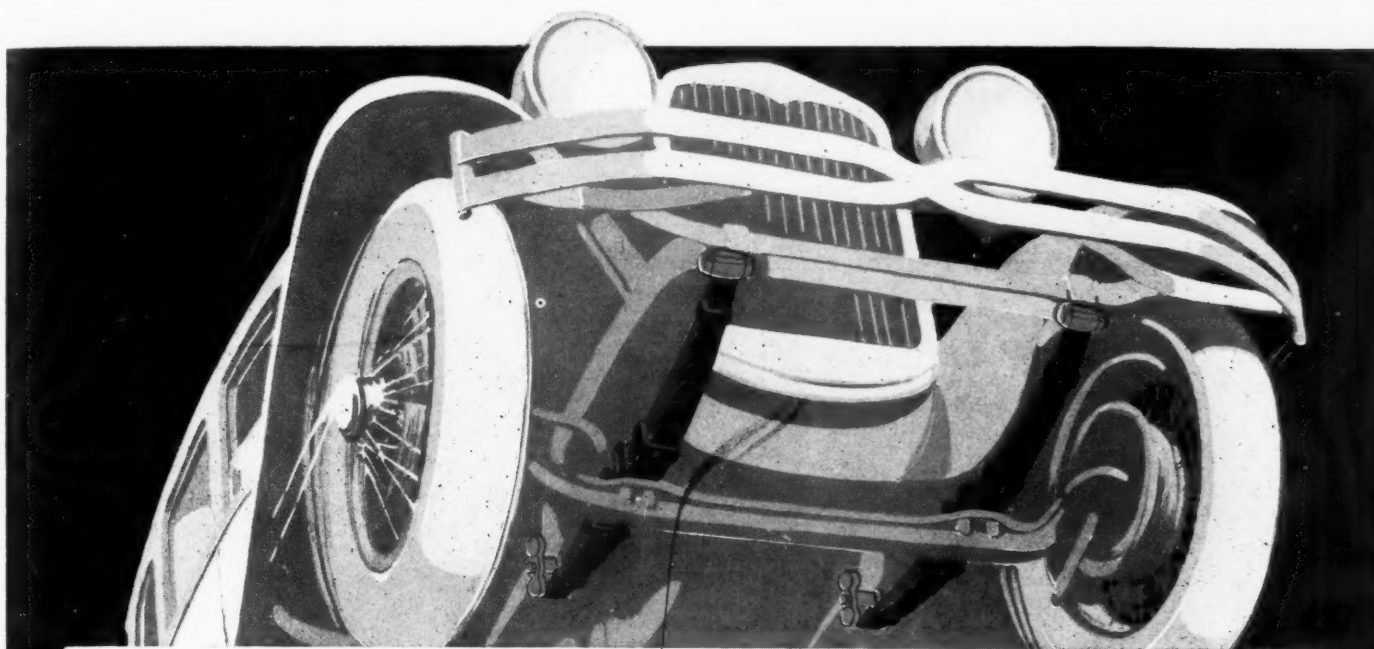


AUTOMOTIVE INDUSTRIES

Volume 58
Number 23

PUBLISHED WEEKLY AT CHESTNUT AND 56TH STREETS
PHILADELPHIA JUNE 9, 1928

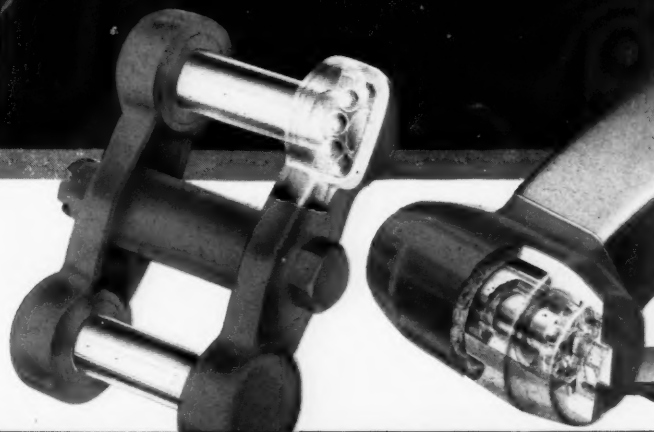
35c a copy
\$3.00 a year

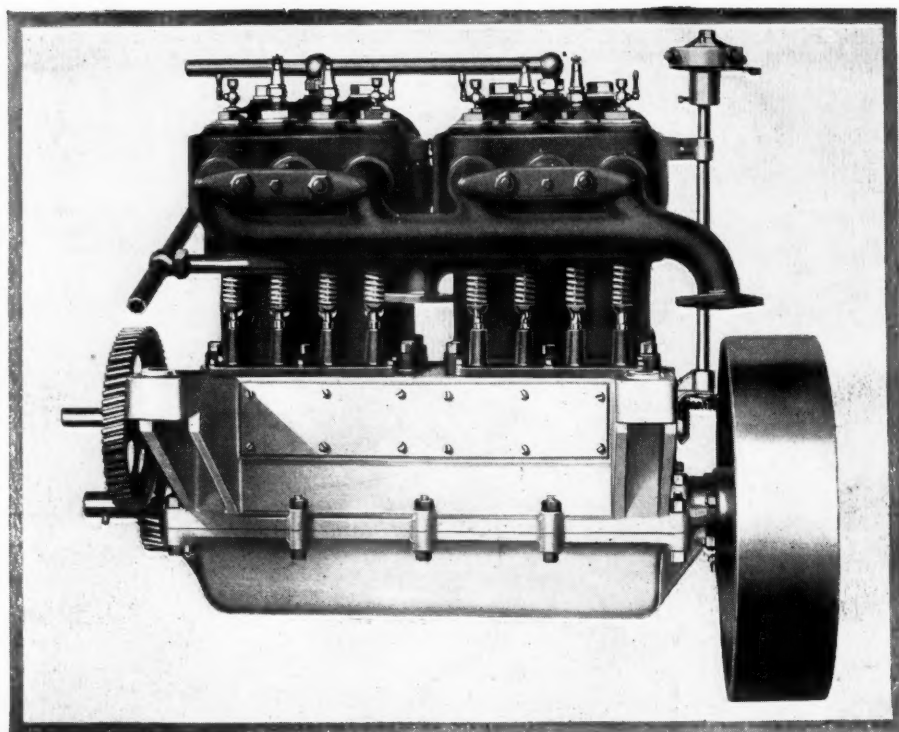


• • No greasing — no squeaks — no rattles — no adjustments — when the running gear is linked to the frame by Fafnir Ball Bearing Spring Shackles. Shackle-bound springs and unequal shock absorber action are banished forever. The luxurious riding quality of a new car becomes a lasting comfort. THE FAFNIR BEARING COMPANY — *Shackle Division* — NEW BRITAIN, CONNECTICUT

FAFNIR

**BALL BEARING
SPRING SHACKLES**



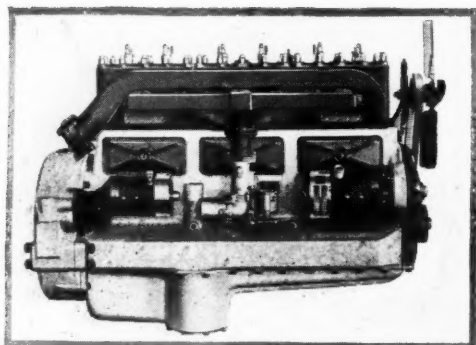


The First Waukesha Engine—40 Roaring Horse Power

a-826-LC

The Roaring Forties

More than twenty years of steady progress stand between the first Waukesha engine and the present highly refined powerful coach engines of today. During that period the Waukesha Motor Company has introduced the demountable cylinder head, fully enclosed valve gear, the Ricardo combustion chamber, the truncated non-rocking cylinder block, over-size chrome-nickel steel crankshaft, and the super-rigid "girder" type crankcase, many of which are still exclusive Waukesha advantages.



Today's Quiet, Smooth 120 H. P. Engine

D-804-S

No coach engine is truly modern without at least some of these important features, and only a Waukesha powered coach has them all. To fully appreciate the progress that has been made in this art the small picture at the left shows the present 120 H.P. Waukesha Motor Coach Engine. Send for bulletin No. 592 giving full particulars.

A-843-LC

AUTOMOTIVE EQUIPMENT DIVISION

WAUKESHA
Waukesha

Eastern Sales Offices

MOTOR

Eight W. 40th Street

COMPANY
Wisconsin

New York City

Exclusive Builders of Heavy Duty Automotive Type Engines for Over Twenty Years

AUTOMOTIVE INDUSTRIES

VOLUME 58

Philadelphia, Saturday, June 9, 1928

NUMBER 23

Dodge-Chrysler *Merger* Unites Two Great Properties

Announcement came as surprise, although some such move was regarded as inevitable by those familiar with Chrysler's progress. Joins two of strongest dealer organizations.

By John C. Gourlie

IN the history of an industry replete with the romance of big business, the prospective Dodge-Chrysler merger takes precedence as the most startling development in many years. Not even the sale of Dodge Brothers in 1925 for \$146,000,000 cash can match the latest move for interest and significance.

Although the news of the culmination of the negotiations caught nearly everyone unawares, some such eventuality had been regarded as inevitable by those who had closely watched the meteoric rise of the Chrysler Corp. and who knew something of the personality of its chief, Walter P. Chrysler. Expansion had strained the physical capacity of the company and further progress along the course already charted clearly called for radical measures.

Expressed in figures, the merger makes possible a yearly production for the combined factories of around 1,000,000 vehicles. The market value of the securities of the two companies at recent prices is approximately \$432,000,000, of which \$174,000,000 is the Dodge share and \$258,000,000 is accorded to Chrysler.

It is estimated that the combined dealer organizations will total at least 8000 outlets, well placed territorially and sound financially. Both organizations have sought and maintained close relations with their dealers and have been prolific in excellent sales promotion material and ideas for the better handling of cars at retail. In these days when the battles of the industry are fought and won in the field, the importance of good distribution is paramount.

The merger, not less significantly, will give Chrys-

THE accompanying article gives some of the facts of the proposed Chrysler-Dodge merger and presents the record of financial achievement and personal enterprise shown by the Chrysler Corp. and Walter P. Chrysler.

The article on page 865 by Norman G. Shidle pictures the possible effect upon the industry of the current merger and those in process of negotiation, pointing out that a reorientation of fundamental concepts is required by the accelerated trend toward combination.

ler an interest in the truck field. The notable success of the Dodge-Graham organization in this respect has won the sincere admiration of observers and has been of great value to the dealers. The inclusion of trucks will aid materially in giving the Chrysler combination a rounded line.

Total assets of the Chrysler company at the

end of 1927 were \$103,894,681 and of Dodge Brothers \$131,569,968, for a combined total of \$235,364,649. Unit sales of the companies have compared in recent years as follows:

| | Chrysler | Dodge | Total |
|------|----------|---------|---------|
| 1927 | 192,083 | 205,260 | 397,343 |
| 1926 | 170,392 | 331,764 | 502,156 |
| 1925 | 137,668 | 259,967 | 396,635 |

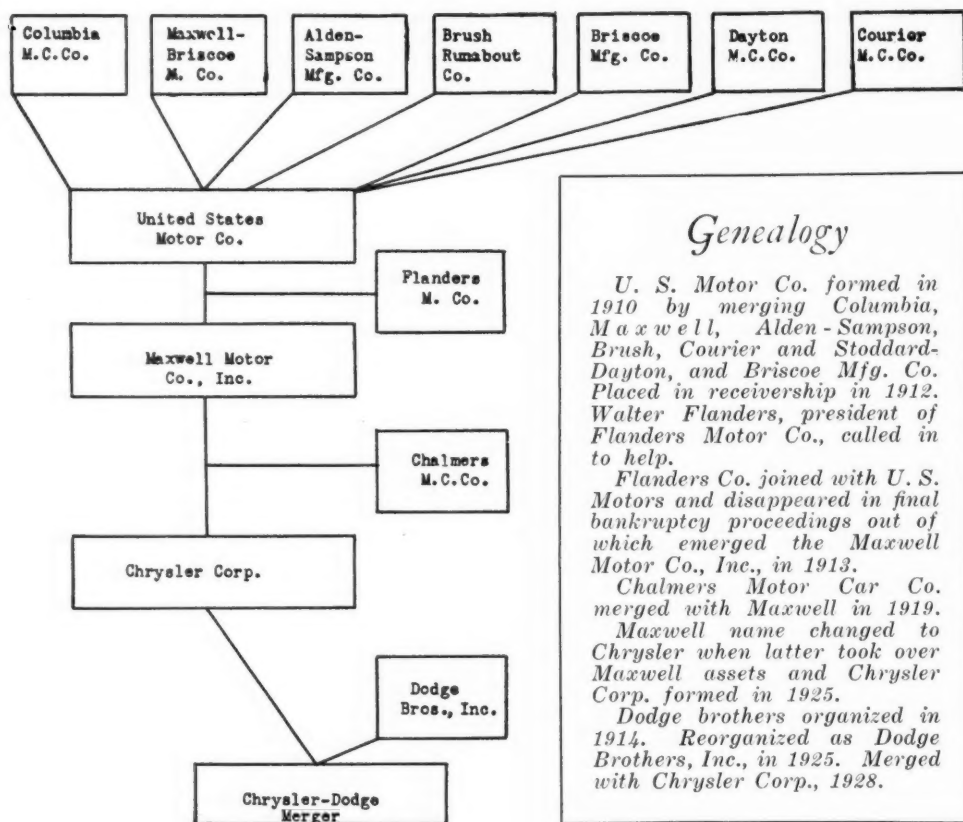
In dollar volume the comparison is approximately as follows:

| | Chrysler | Dodge | Total |
|------|---------------|---------------|---------------|
| 1927 | \$172,000,000 | \$174,000,000 | \$346,000,000 |
| 1926 | 164,000,000 | 253,000,000 | 417,000,000 |
| 1925 | 137,000,000 | 217,000,000 | 354,000,000 |

These figures are sufficiently impressive, but the men of the industry will appreciate even more some of the factors not so readily expressed in arithmetic. Two of the finest dealer organizations selling motor vehicles will be brought into one family, although, as concerns production and distribution, the two companies will continue to have separate entities. Centralized control with decentralized operations would appear to be the plan from the preliminary statements issued.

The general impression that the Dodge and Chrys-

Chrysler-Dodge "Family Tree"



ler passenger car lines are directly competitive at all points is not borne out by comparison of the prices in effect when the merger negotiations were completed. The accompanying table gives this comparison, the prices given being those of the lowest priced four-door sedan on each chassis.

General Motors prices are also given. This company has proved the feasibility of selling cars in large volume priced at rather close intervals. In fact, the highest priced cars on some of the chassis are more expensive than the lowest-priced model of the lines immediately higher.

So much for the present position of the combination. A glance back over the eventful history of the Chrysler Corp. will show how the forces leading to the merger began to appear some years ago.

The present company is an outgrowth of the Maxwell Motor Co., Inc., itself a product of the reorganization, in 1912, of the United States Motor Co., one of the early attempts at a merger of ill-assorted elements. The Chalmers Motor Corp. was later taken into the fold.

Maxwell in 1920 was on the verge of bankruptcy, with heavy indebtedness to the banks and trade creditors, towering inventories and a paucity of active dealer accounts. Stern action was called for, and the banking interests turned to the man who had already made a unique reputation for himself as a production and sales executive and

more particularly as a savior of wabbling corporations.

Mr. Chrysler was then executive vice-president and general manager of the Willys-Overland Co. He had entered the industry in 1911, having been manager of one of the plants of the American Locomotive Co. His first automotive association was with Buick, and a notable reorganization of that company's production led to his appointment as president.

A man of tremendous ambition and inflexible purpose, Mr. Chrysler, starting on the Maxwell-Chalmers job, plunged into the task at hand; holding off creditors while reorganizing production and launching a vivid sales campaign. Slowly at first, but then swiftly, the company was brought to prosperity, the most important development of the ensuing years being the introduction of the Chrysler car in 1924. The follow-

ing year the company's name was changed to the present form.

In 1921 the company had a run-down factory and \$7,000,000 borrowed working capital. There were mortgages and notes totaling \$16,000,000. The market value of the outstanding stock was only \$19,325,000.

At the end of 1927 net working capital was \$42,379,332; the only funded debt was \$1,168,000 in Maxwell Motor Corp. mortgages; and the vastly expanded plants were models of new equipment and efficient layout. The market value of the securities has already been given.

In 1922 the company was already beginning to show a profit, the net for the year being \$831,662. Each succeeding year, except for a slight recession in 1926, has shown a major gain in profits over the preceding year, the figure for 1927 having been \$18,484,880.

The most striking advances have been made, however, since the Chrysler Corp. came into being. In the three years to 1927, inclusive, the company earned over \$46,000,000, of which \$30,609,000 was retained in the business.

At the same time it was spending a total of \$21,112,000 for property expansion and betterment. Conservative depreciation charges, however, kept the property account on the books of the corporation from a corresponding expansion, this item being \$22,246,000 at the end of 1927 compared with \$15,930,000 at the close of 1924.

Car Prices in Dodge, Chrysler and General Motors Lines

Lowest Price 4-Door Sedan

| GENERAL MOTORS | | CHRYSLER AND DODGE | |
|----------------------|---------|------------------------|---------|
| Cadillac | \$3,395 | Chrysler Imperial "80" | \$2,945 |
| La Salle (134" W.B.) | 2,775 | Chrysler "72" | 1,595 |
| La Salle (125" W.B.) | 2,495 | Dodge Senior | 1,595 |
| Buick (128" W.B.) | 1,925 | Chrysler "62" | 1,175 |
| Buick (120" W.B.) | 1,495 | Dodge Victory 6 | 1,095 |
| Buick (115" W.B.) | 1,295 | De Soto | 895 |
| Oakland | 1,145 | Dodge Standard 6 | 895 |
| Oldsmobile | 1,025 | Chrysler "52" | 720 |
| Pontiac | 825 | | |
| Chevrolet | 675 | | |

Mergers Past *and* Present, With *a Look at the Future*

*Chrysler-Dodge combination makes fifth multi-company giant
in the industry and another may be created soon, but
smaller organizations will continue to thrive.*

By Norman G. Shidle

THE head of another Titan is rising on the slopes of our automotive Olympus. Like the six sons of Uranus who ruled the earth before the Zeus dynasty took charge on the mount of the Gods, a group of five industrial combinations has grown up in the automotive field with a sixth a quite definite possibility within the twelve-month. And as the mythological Titans were regarded by the ancients as incarnations of natural forces, so the combined groups which have developed in the automotive industry may properly be regarded as the incarnation of natural economic forces which have been operative to a greater or less degree since its inception.

The romance surrounding the beginnings and growth of the modern giants, too, is none the less fascinating, none the less intriguing, than the fabled aspirations, battles and activities of the six sons of Uranus and Gaea. Such speculation regarding the future as is

possible, moreover, indicates the writing of even more dynamic and constructive pages of automotive history in the future than in the past.

The acquisition of the Dodge interests by Walter P. Chrysler and the rumored intention of adding to that combination one or more other companies as time goes on makes pertinent an attempt to visualize clearly the entire automotive industrial situation in its present state as it relates to mergers, combinations and multi-company industrial units in general. Some such analysis is essential as a basis for intelligent speculation as to future trends and probabilities both for the industry as a whole and for individual concerns within the industry.

The new Chrysler-Dodge combination takes its place as third in size among the five big multi-company passenger car manufacturing units now existing in the industry, so far as total assets are concerned. The

Recent Mergers Among Automobile, Parts and Accessories Companies

1927

Midland Steel Products Co. bought Steeldraulic Brake Co.

Westinghouse Air Spring Co. and Cleveland Pneumatic Tool Co. merged.

Briggs Mfg. Co. bought LeBaron, Inc.

Federal-Mogul Corp. bought U. S. Bearings Co.

Kelsey Wheel Co. and Hayes Wheel Co. merged.

Hayes Wheels & Forgings, Ltd., merged Hayes Wheel Co. of Canada, Ltd., and Canadian Hardwood Co., Ltd.

American Chain Co. bought Manley Mfg. Co.

Murray Corp. of America bought Jenks & Muir Mfg. Co.

Blackhawk Mfg. Co. bought Hydraulic Tool Co.

General Motors Corp. bought Blossom Lock Co.

Auburn Automobile Co. bought Lycoming Mfg. Co., Duesenberg, Inc., and Limousine Body Co.

Kingston Products Corp. merged Kokomo Brass Works, Byrne, Kingston & Co., and Kokomo Electric Co.

Delta Electric Co. bought Accessories Mfg. Co.

Splitdorf Electric Co. bought American Electric Motors, Inc.

American Coach & Body Co. bought Truck Engineering Co.

American-LaFrance Fire Engine Co. bought Foamite-Childs Corp.

Diamond Parts Co. merged Diamond Motor Parts Co., Gill Mfg. Co., and Schlieder Mfg. Co.

Breeze Corp., Inc., bought Mays Equipment Co. Ajax Tire & Rubber Co. and McClaren Rubber Co. merged.

Unit Corp. of America merged Obenferger Forge Co., and Dallmann Machine & Mfg. Co.

Standard Auto Bolt Co. bought Mason Motor Co.

1928

Electric Auto-Lite Co. bought U.S.L. Battery Corp.

Biflex Products Corp. merged Biflex Products Co. and L. P. Halladay Co.

W. G. Nagel Electric Co. and Safe-T-Stat Co. merged.

McQuay-Norris Mfg. Co. bought King Quality Products Co.

Pines Winterfront Co. bought Detroit Motor Appliance Co.

Marvel Carburetor Co. bought Wheeler-Schebler Carburetor Co.

Veeder Mfg. Co. and Root Co. merged.

Unit Corp. of America bought Fuller & Sons Co.

Truscon Steel Co. bought Hydraulic Pressed Steel Co.

Borg-Warner Corp. merged Borg & Beck Co., Warner Gear Co., Marvel Carburetor Co., and Mechanics Machine Co.

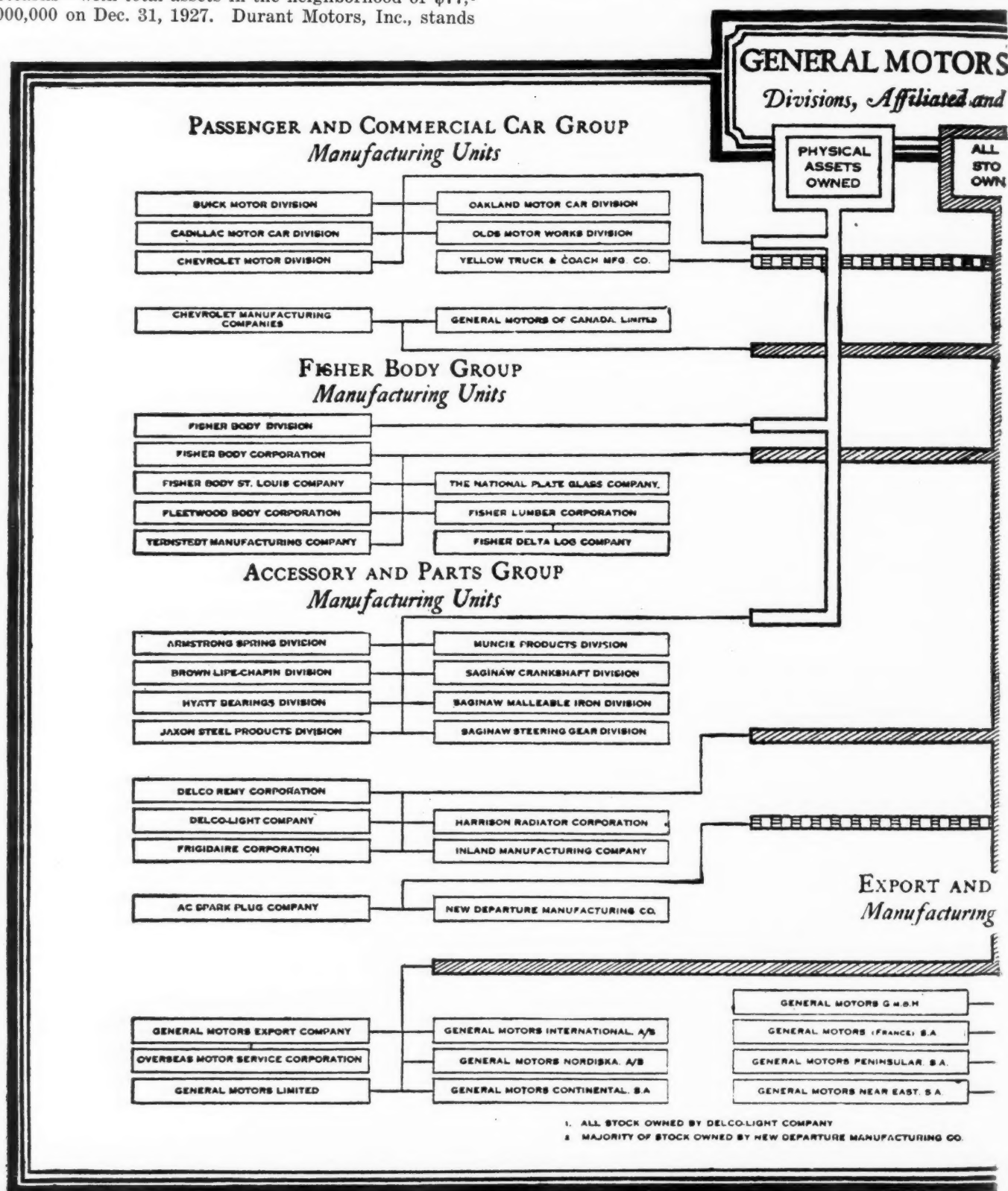
Chrysler bought control of Dodge.

largest, of course, is General Motors Corp. with total assets of \$1,098,477,576 showing on its balance sheet as of Dec. 31, 1927. General Motors is one of the few billion-dollar corporations in the United States today.

Second comes the Ford Motor Co. Ford showed total assets of \$742,056,101 on Dec. 31, 1927. Third in line, as mentioned, is the new Chrysler-Dodge merger with total assets of \$235,464,649 on Dec. 31, 1927; while fourth in the multi-company group are the Willys interests—including Willys-Overland, Falcon and Stearns—with total assets in the neighborhood of \$77,000,000 on Dec. 31, 1927. Durant Motors, Inc., stands

fifth with a total asset figure of \$42,360,396 shown on its balance sheet as of Aug. 31, 1927.

The total assets of this group of automotive Titans, then, stands today probably at nearly \$2,200,000,000. This compares with total assets for the five largest of the other passenger car producing companies of approximately \$352,000,000. To be consistent, perhaps, the Auburn-Duesenberg combination might have been included in this multi-company passenger car group, but Duesenberg has thus far been so small a factor in

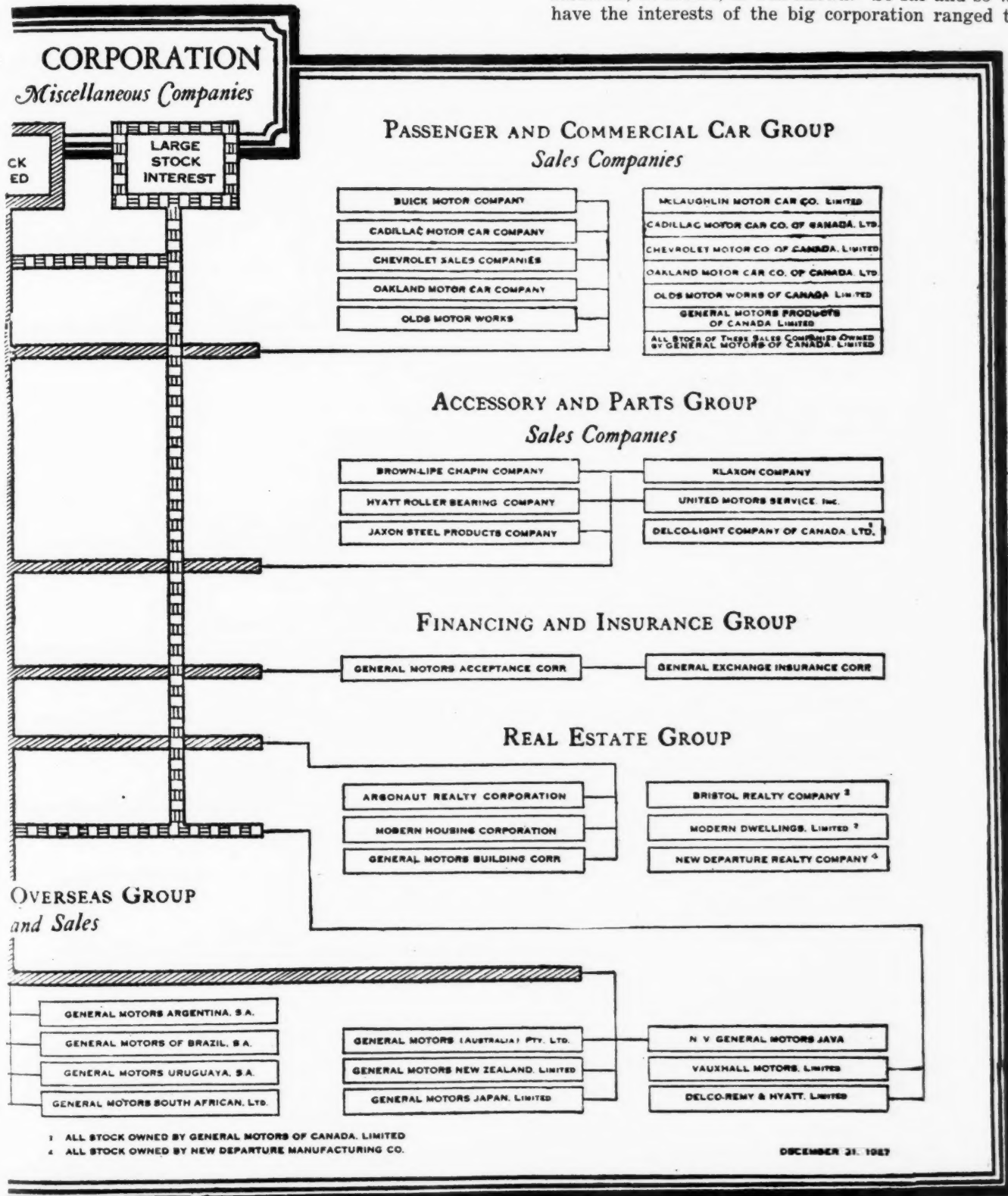


Organization chart showing broad

the commercial stock car market as to make the inclusion questionable. That the E. L. Cord interests will not be among those obviously a part of the multi-company group a year hence, however, certainly one would hesitate to predict. As is known, Mr. Cord acquired the Lycoming Motors Co., the Limousine Body Co. and Duesenberg Motors Corp. within the last year or so. In a statement made to *Automotive Industries* a few months ago he said that, while he sees a good future for the small company, he hoped to make his interests

grow large. His name has been coupled with a number of important merger rumors in the last few months.

The policies and activities of these multi-company passenger car units as regards adding parts and accessory companies to their groups is, naturally, of primary interest to important elements in all phases of the industry. Some of them, as a matter of fact, have not gone as far in the acquirement of parts and accessory subsidiaries as have some of the individual passenger car manufacturers. The vast sweep of General Motors' interests, of course, is well known. So far and so wide have the interests of the big corporation ranged that



Scope of General Motors interests

the compilation of a single organization chart indicating the various subsidiaries which it owns in whole or in part becomes an infinitely complex task.

Despite the great number of companies now associated with General Motors, it is worth noting that a number of names in the early days passed into oblivion through the big combine in addition to those outstanding ones which now are products of the corporation. Formed originally with Oldsmobile and Buick in 1908, General Motors had acquired control of Welch, Rainier, Oakland, Cadillac, Elmore, Reliance Truck, Northway Motors and Motor Parts Co. by 1909. By 1910, Marquette, Randolph truck and Cartercar had been added. In 1917 Scripps-Booth was acquired, manufacture of Cartercar having ceased in 1915. Chevrolet came into the G.M.C. fold in 1918, having previously absorbed the Little Motor Car Co. The Inter-State was bought by G.M.C. in 1919 and the Sheridan was launched in 1920. Ralph Epstein, in his recent historical work on the automotive industry, quotes Mr. Durant as saying that, when head of General Motors, he acquired the Elmore to cover himself on the two-cycle engine which it had, and the Cartercar because of its friction drive, since he was not certain at that time in just what direction the future development of the automobile might go.

A good idea of the present scope of General Motors' interests is clearly indicated in the accompanying organization chart issued recently.

The Ford Organization

Ford also controls tremendous natural resources as well as some equipment sources. Among these may be mentioned the Michigan Iron, Land and Lumber Co.; Allegheny Plate Glass Co.; Fordson Coal Co. and the Johansson Gage Co. The Lincoln car and the Stout Metal airplane comprise the extent of the Ford's unit manufacturing in addition to the Ford car, tractor manufacture having been discontinued, at least temporarily, a few months ago. Thus, it would appear that Ford has gone in for control of natural resources and individually needed transportation facilities such as steamship lines and railroads, rather than for the acquisition of outside parts and accessory manufacturing units. Despite the great manufacturing activities within the Ford plants, the Ford Motor Co. is one of the largest purchasers of parts and materials from independent equipment sources.

The Chrysler-Dodge combine thus far controls practically no parts, accessory or raw material producing organizations outside its own fold. Both of these companies have manufactured a large part of their requirements within their own factories, but both have been and still are heavy purchasers of materials and supplies from independent makers in the industry.

The John N. Willys interests, comprising Willys-Overland, Falcon-Knight and Stearns-Knight, control the Willys-Morrow Manufacturing Co. and the Wilson Foundry & Machine Co., the latter building part of the engine requirements of these companies, but otherwise does not own parts or accessory units of importance. Mr. Willys got his Knight engine interests originally through purchase of the Edwards Motor Car Co. in 1913, an organization which at that time manufactured an Edwards Knight-engined car. He also bought the Garford Company which was then building a passenger car. It is interesting to note, moreover, that the Willys-Overland Co. once owned the Kinsey Mfg. Co. and the Federal Motor Works, both of which have been dissolved, as well as control of the Curtiss Aeroplane & Motor Co. which was sold to C. M. Keys in 1920.

The Durant interests have been many and varied,

both as to passenger car lines and other subsidiaries since January, 1921, when Mr. Durant started the organization which bears his name. The history of Durant Motors, Inc., has been one of consolidation of original interests rather loosely allied in the beginning. In May, 1924, Durant Motors, Inc., acquired an interest in Star Motors, Inc., which already was a W. C. Durant interest, and offered to exchange one share of Durant stock for each two shares of Star stock. The company now owns entirely a number of subsidiaries including Durant Motor Co. of N. J.; American Plate Glass Co.; Motor Parts Corp.; New Process Gear Co.; Warner Corp.; Locomobile Co., and Adams Axle Co.

Two passenger car lines—the Durant and the Locomobile—and one truck line, the Rugby, now constitute the Durant projects in the complete vehicle manufacturing field. Into this form have been consolidated the various names which have appeared under the Durant banner in the last eight years, including the Flint, the Star, the Sheridan, the Princeton and the Eagle.

Thus it appears that while General Motors and Durant have acquired large holdings of previously independent parts companies, neither the Ford, Willys, or Chrysler groups have thus far gone in heavily for the purchase and consolidation of independent parts manufacturing companies already in the field. Whether they will continue to operate as in the past cannot be definitely stated, but the situation as it exists at the moment seems fairly clear. Even those of the multi-company units which have bought out large independent parts interests still are among the largest buyers from outside suppliers, while the others continue to offer a large market and field for original equipment sales.

While in the midst of considerable public and financial district comment about an era of mergers and combinations having arrived in the automotive field, it is interesting to examine somewhat more closely than perhaps has been common the status of the big and the small independent producers in the passenger car field.

Outside of the multi-company group thus far discussed, Studebaker, Hudson, Packard, Nash and Reo are the largest car manufacturers in point of total assets. Of these five, three—Studebaker, Hudson and Packard—each have total assets considerably in excess of the smallest of the multi-company groups, while Studebaker exceeds Willys-Overland, as well as Durant. The last fiscal year balance sheets show, for example, total assets for these companies as follows: Studebaker, \$135,877,947; Hudson, \$61,679,800; Packard, \$61,518,952; Nash, \$59,309,602; Reo, \$33,513,202. Then next in line comes Hupmobile with \$24,030,739; Chandler with \$18,445,089; Graham-Paige with \$16,737,961, and Auburn with \$10,850,426.

Earnings Per Share Figures

Study of the earnings-per-share figures of the various companies gives no definite indication of advantage either to the multi-company or to the independent company groups. General Motors earnings per share for 1926 and 1927 are not readily comparable because of the increase in number of outstanding shares during the period, but the astounding success of the corporation from a profit standpoint is too generally recognized to need discussion here. Net income available for dividends was \$235,104,826 in 1927 as against \$186,231,182 in 1926.

In 1926 Dodge earned \$6.46 per share on its common stock while Chrysler earned \$4.77, but in 1927 Chrysler earned \$6.25 as against only \$1.55 for Dodge, making a total earnings per share for the two of \$11.23 in 1926 and of \$7.80 in 1927. Last year Willys-Overland

earned \$2.04 per share, while Durant showed a deficit.

Important independent manufacturers, on the other hand, earned from \$8.30 per share in the case of Nash to \$2.04 per share in the case of Reo. Studebaker had \$5.87 per share, Packard \$3.91 per share, Hupmobile \$2.70 per share and Hudson \$2.70 per share.

Even from a net profit standpoint a comparison of the two groups is difficult for the past year because of the unusual situation in the Ford organization, which normally would be one of the big profit-producers in the multi-company group. Although actual figures are not available, it is probably safe to assume that Ford made little if any profit last year. Figuring on that basis, it appears that the five members of the multi-company group last year showed net profits of about \$270,500,000 as compared to about \$67,000,000 for the five largest independent producers.

Independents in Front

Excluding General Motors, however, the earnings of the other four of the multi-company organizations for 1927 totaled only \$35,500,000 as against about \$61,000,000 for the four largest independent producers.

Profits per car figures based on net income and total production tend to be a bit misleading, of course, because so many factors go into the making up of net profits in addition to the profit accruing directly from the sale of the car itself. Such figures do give some general idea, however, of the relative situation as between different companies. On the average, profits per car ran higher in the independent group last year than in the multi-company group, although this condition was more or less to be expected in view of the presence in the multi-company group of a number of the lowest priced cars on which the profit per car naturally would be relatively smaller than on the higher priced lines. The multi-company group of five built nearly 76 per cent of all the cars produced in 1927.

It would appear both from the individual histories of Dodge and Chrysler as separate organizations, as well as from the tremendous assets held by each of five or 10 other important individual companies today, that an automotive concern can gain the economies inherent from large size as an individual as well as in the form of a merged organization. Some of the companies which still operate independently have just as large a claim to girthhood as have some of the multi-company groups.

But what of the smaller independents? Is girthhood essential to continued success in the automotive manufacturing field? Must the smaller companies combine or go out of the picture?

There is a strong tendency in some quarters to answer "Yes" to this latter question quickly and unequivocally. But such an answer doesn't visualize clearly all of the facts in the situation. The following factors, it would appear, must be definitely considered and given their fair weight in coming to any concrete conclusion.

1. The history of every other industry which has finally ended up with two or three or four dominating large units has been that a certain number of small, soundly managed, progressive companies have been able to stay in the field and make good profits. This has been the case in both the steel and the petroleum industries.

2. There is a natural, psychological antipathy on the part of a certain number of people to buying from companies which seem too dominant. The small producer has a certain appeal to a special portion of the public just because he is small and because he does offer them a certain exclusiveness.

3. The small maker has an opportunity to make rapid

changes, begin innovations and provide a variety in his product which is more difficult for the large producer.

It would seem, therefore, that a profitable place for at least five or 10 small passenger car builders operating on a national scale will always exist, with perhaps an opportunity for some others operating on an actual or even an avowed territorial basis.

The automotive battle of the future seems far more likely to be fought out in the dealer field than in the factories. It is here, even more than in manufacturing, that intelligent leadership and constructively planned activities will count heavily. No consideration of the position of the multi-company groups with those of the various independents, consequently, is worth while without including some analysis of this important dealer situation.

Good dealers, of course, are far more important than mere numbers, as many manufacturers have learned by experience in the last decade. Yet there can be no blinking the fact that, up to a certain point at least, mere coverage and extensiveness of representation does offer a gage of possible sales.

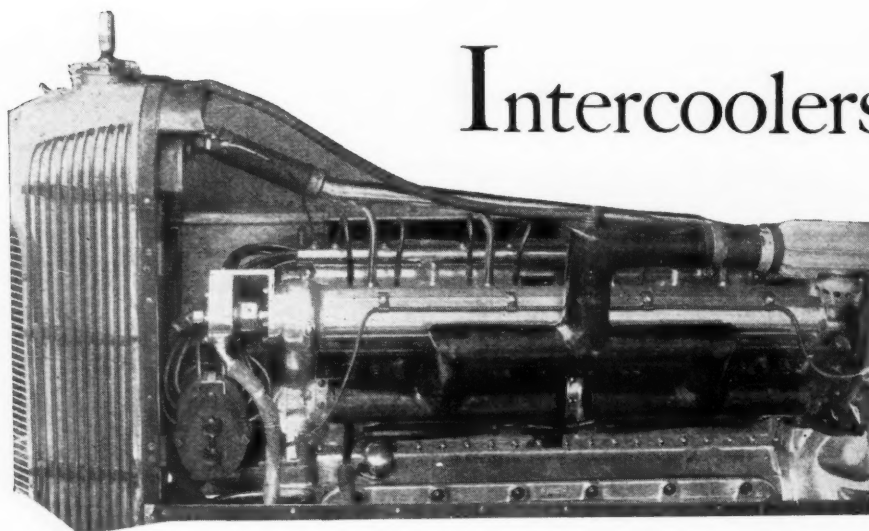
While any calculation of number of dealers made today will contain slight inaccuracies tomorrow, the daily checking of the Chilton Class Journal dealer list makes it the most accurate record available in the country on this subject. With a count made recently from that list as a basis, it is shown that the five multi-company groups discussed in the beginning of this article have today approximately 40,000 dealers merchandising their automobiles and parts to the public. Of this group nearly 18,000 handle General Motors lines, leaving about 22,000 as a total for the remainder of the group. The five largest independents at the moment have about 11,000 retail outlets, a figure which must be judged comparatively in view of the fact that the Ford, the Chevrolet, the Whippet four, the Chrysler four and the Durant four—the lowest priced cars on the market—are all included in the multi-company group.

While mergers have been coming thick and fast in the automotive field during the last 18 months, it is worth remembering that combinations and consolidations are not new to the industry and that in years past similar events have taken place without changing radically the course of development either of the industry as a whole or of the companies concerned in the mergers. History does not always repeat itself, but the experience thus far in the automotive field has been that combination of strong companies usually has resulted in continued and increased strength, while combination of weak companies has rarely led to any radical or immediate increase in strength.

Mergers of the Past

Important mergers of the past which come immediately to the mind of those familiar with bygone days of the industry are the absorption of E.M.F. by Studebaker, the bringing together of three companies in the National Motors Corp., and the Hares Motors, Inc., venture in 1920. The Everitt-Metzger-Flanders Co., it will be recalled, was formed in 1908 by bringing together the Northern and Wayne car companies, which were quite well known at that time. These two names were discontinued and the manufacture of E.M.F. begun in that year. E.M.F. also bought the DeLuxe Motor Car Co. in 1909 and terminated production of the latter. Studebaker acquired the selling rights to E.M.F. and finally merged the latter corporation with itself in 1910. E.M.F. lost its identity in 1912 when the car name was changed to Studebaker.

(Continued on page 885)



The only water-cooled intercooler in the race was used on the Chromolite Special, a chromium-plated car. Notice the water pump at the front of the camshaft housing on the top of the engine

Intercoolers Viewed as at Indian

*Credited with increasing
contest. Vary in de*

By C. Edward Packer

HIGHER speeds than were ever before attained on the Indianapolis Motor Speedway were reached this year. While many refinements had been made in the cars, there was nothing that showed so much development as the intercoolers or intake manifolds connecting the superchargers with the engine. There is no doubt that in the past considerable power has been sacrificed on account of over-expansion of the mixture.

More than a year ago Frank Lockhart was developing a cooling type of intake manifold. The perfection of his early plan was seen in the Simplex Piston Ring Special with which Ray Keech, holder of the world's speed record, landed in fourth place. As is common practice the carburetor was mounted under the cowl on the back of the supercharger, the mixture from the supercharger entering the large finned intake manifold shown in the illustration. This intercooler is an aluminum casting with a maximum of surface. The combination of permitting the mixture to expand slightly and also to come in contact with the cooling surface reduced its temperature considerably.

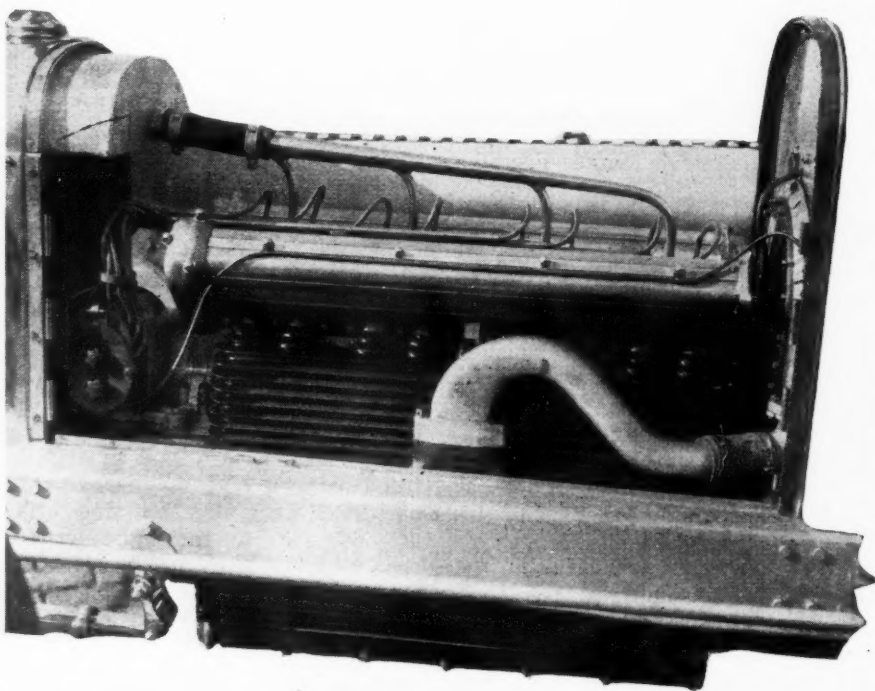
An intercooler developed by Fred Comer and used on the No. 25 Boyle Valve Special was made of copper tubes. There were 72 of the tubes, each about 9 in. long and $\frac{1}{2}$ in. in diameter. As will be seen, these are assembled about like the tubes in a Ford radiator except that there

are no fins. These 72 tubes were divided into two groups, one group for each block of four cylinders. The mixture for the engine was delivered by the supercharger to a bottom passageway to which the tubes were attached. Up through these copper tubes the mixture passed on its way to the cylinders. As this intercooler was directly in line with the cooling air that passed through the radiator, the device was quite effectual.

Speaking of getting the direct draft of air, one should note what bulged from the right side of the engine on Duray's Miller Special, with which he spectacularly beat the former track record of 120.1 m.p.h. held by Frank Lockhart when he turned one lap at 124.018 m.p.h. and qualified at 122.319 for four laps. Here was another type of intercooler which caused the incoming charge, hot from the supercharger, to turn a couple of right angles, striking the cooling surfaces and hence cool down and contract a bit so that more fuel could be forced in for each explosion.

The Duesenberg development in an intercooler this year consisted of four down-draft passages, each liberally finned and placed in line on the left side of the engine. The supercharger drew the air in through the Winfield carburetor and forced the charge up through the center passage of the intercooler to the header. From here it was distributed to each of the four passages for cooling before entering the engine.

Only one water-cooled intercooler appeared. It was seen on the sparkling Chromolite Spe-



The intercooler as developed originally by Frank Lockhart and used on the Simplex Piston Ring Special

Main Development apolis Race

*speed of cars in this year's 500-mile
sign. Only one water-cooled.*



Louie Meyer, winner of this year's Indianapolis race. Driving a Miller Special, he finished the 500 miles in 5:01:33.75 for an average of 99.482 m.p.h., thus setting a new track record for the distance for 91½ cu. in. cars. The order in which the other drivers finished was given in last week's issue

drawn from the bottom of the intercooler radiator, forced into the bottom of the intercooler and taken from the top, from whence it flowed to the top of the intercooler radiator. In other words, the flow was exactly as it was in the cooling system of the engine.

A new Schebler carburetor has been developed by Al Timian, chief engineer of the Schebler Carburetor Co., and was seen in action on the Chromolite Special, which was driven by Earl Devore. The Miller entry which Hepburn drove had a number of developments incorporated in it. The impeller of the supercharger was larger and was driven at about five times engine speed instead of the former 5½ ratio. Harry Miller remarked that the engine would turn slightly in excess of 8000 r. p. m. Much larger fuel in-

cial—the car on which everything of metal was chromium-plated. The intercooler of this car had a separate radiator. This radiator surrounded the regular engine radiator. At the bottom was a copper tank and on the sides of the regular radiator were copper tubes which cooled the water from the intercooler. This intercooler looked most like a regular intake manifold. Of course it had double walls with the water circulating between.

Circulation was obtained by the use of a centrifugal water pump mounted on the front end of the left camshaft housing. It was directly coupled to the camshaft. Water was

take passages, in fact just 50 per cent larger than were employed last year, were used in this job.

As the intercooler on this car is now down on the right side of the engine, where the oil tank was formerly located, it was necessary to find a

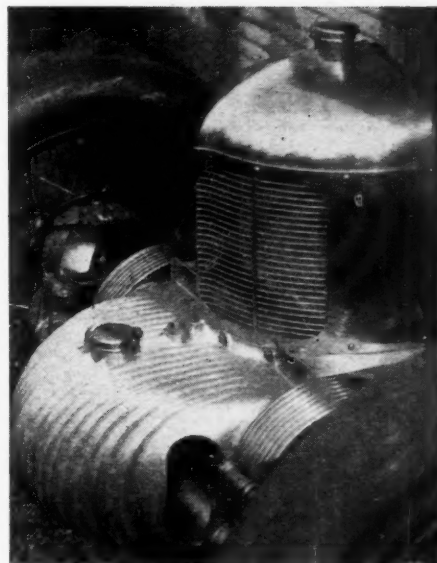
new location for the tank. It was placed out in front, actually surrounding the front axle. While this made the transmission of this front-drive job a little inaccessible, the tank position assured ample cooling for the oil and its weight greatly improved traction.

The time of Louie Meyer, the winner, did not equal the track record set in 1925 by Peter DePaolo, in a Duesenberg, whose time was 4 hr. 56 min. 39.46 sec., an average of 101.13 m.p.h. It does, however, represent the best mark made since the 91 cu. in. jobs have been used. Souder's time in a Duesenberg last year was 5 hr. 7 min. 33.08 sec., an average of 97.54 m.p.h. In 1926, when rain limited the race to 400 miles, Lockhart averaged 95.885 m.p.h.

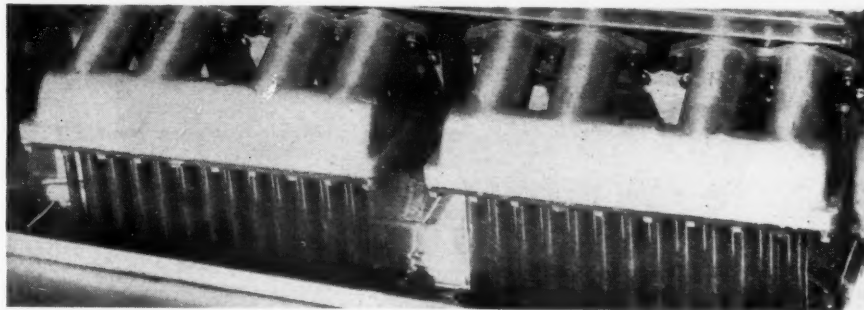
This year's winner had his first baptism on the Indianapolis track last year when he relieved Wilbur Shaw. The car he drove this year was the same used by Anthony Gulotta last year, when Gulotta finished third. By a peculiar turn of fate the car had been entered this year by Phil Shafer, with Shaw scheduled to drive it. Several days before the race Meyers induced Alden Sampson, a friend, to purchase it from Shafer and Meyers was named pilot. Meyer's is 23 years old and married.

In many respects this year's race was similar to last year's classic, with a number of the favorites being forced out by mechanical troubles. For the first 150 miles, Duray, in a front-drive Miller, set the pace and when he experienced much trouble Gleason, in a Duesenberg Special, took the lead and held it to approximately

the 350-mile mark. Here Gulotta's Stutz forged ahead and maintained the lead until a clogged oil line halted him. Gleason then led until forced out by engine trouble, giving Meyer the lead, which he held.



Front end of new series front drive Miller showing the recently developed oil radiator



The copper tube intercooler developed by Fred Comer

Industry Rid of "Plus Tax" Phrase After 10-Year Fight

Last of war emergency levies on automotive products passes when President signs tax reduction bill. Means saving of about \$70,000,000 a year to buyers of cars.

By Robert L. Cusick

IF industries, like nations, established holidays to commemorate important occasions, then in the future we might expect to hear a tooting of automobile factory whistles on May 29. That is the date on which President Coolidge signed the tax reduction bill, finally freeing the automotive industry and the purchasing public from the remaining war excise tax on passenger cars and motorcycles.

With the signing of the bill by the President, it immediately became law, and for the first time in 10 years manufacturers were relieved of the necessity of using the term "Plus tax" when quoting passenger car prices.

The elimination of the tax will mean a saving to the automobile-buying public of approximately \$70,000,000 a year. Or it can be put another way: The public will have just that much more money available to spend for automotive products. The passenger car producers stand to gain in two ways. First, the removal of the tax acts as a price reduction and ought to stimulate car sales to some extent. Second, they will no longer be subjected to the bother and expense of keeping the records which the tax required.

The final passage of the tax reduction bill by Congress, and its subsequent approval by the President, were unattended by any great show of pomp or emotion. There were no fireworks or bands. It was just another bill going by in the closing hours of the first session of the 70th Congress. Yet in scores of

automotive headquarters throughout the country it was a momentous event, for it marked the successful conclusion of a hard and continuous 10-year fight to have the tax abolished.

The fight, in fact, started even before the tax was imposed. In the early days of the second Wilson administration, when William G. McAdoo was serving as Secretary of the Treasury, talk of an emergency revenue measure which would include some sort of a tax on motor vehicles began to draw automotive leaders together in a concerted campaign against such legislation.

McAdoo's Recommendation

But it was not until the United States entered the war in April, 1917, that the movement to apply an automotive tax actually began to take concrete form. About the middle of April, that year, Secretary McAdoo formally made his first recommendation to Congress for a tax on motor vehicles. His plan then was to impose a sales tax starting at \$1 on vehicles selling under \$500, and increasing to a maximum of \$10 on vehicles costing more than \$2,000. He estimated that such a tax would give the Government additional revenue of \$19,800,000 for the first year.

Reading over the old files, we find that this recommendation died a silent death, and early in May, 1917, Alfred Reeves, general manager of the National Automobile Chamber of Commerce, was in Washington inquiring into a new proposal of the admin-



Among men of the industry who helped bring about repeal of the automobile excise tax are these four: Left to right—George M. Graham, member N.A.C.C. taxation committee; H. H. Rice, General Motors Corp.; Roy D. Chapin, president N.A.C.C., and Pyke Johnson, N.A.C.C. Washington representative

Oppose Unjust Taxation!

Entire Industry Should Oppose Proposed 5 Per Cent Tax on Car Sales at Factories—Industry Willing to Give Its Share of War Taxes But Such Class Taxation Is Unfair—Tax Cannot Be Passed to Consumer To-day

WASHINGTON, May 2.—The proposed tax of 5 per cent on the manufacture of automobiles by the manufacturer, which has been put forward as one of the taxation measures to raise \$1,800,000,000 war funds, is being opposed by the automobile makers and the industry in general on the ground that this particular form of tax is class legislation and takes the form of a poll tax on a percentage of the population. It has been suggested by certain Washington officials that should the tax become a law it might possibly be declared unconstitutional on these grounds.

Industry Will Pay Its Share

As soon as war taxation measures were proposed the automobile industry expected to stand its share of just equitable taxation and is prepared to do so to-day, but this particular 5 per cent tax which manufacturers must pay on the selling price of each car is considered grossly unfair by the leaders of the industry and as a consequence the entire industry should unite in opposing the progress of the measure through Congress and the Senate.

Latest reports from Washington indicate that the inability of the House Ways and Means Committee to agree on the provisions of a war revenue bill is resulting in a deadlock. One of the most important factors in this situation is the proposed 5 per cent tax on automobiles.

Alfred Reeves, general manager of the National Automobile Chamber of Commerce, has been in the aid in protecting the industry in this matter. He is now before the House and the Senate. This is the first time that the industry has been able to make its report to the Ways and Means Committee.

Write Your Congressman

Every automobile manufacturer and every automobile dealer and garage owner should immediately do his part and write his Congressman. The only way to stop this 5 per cent tax on automobiles is to write your Congressman.

Michigan, who, it is expected, will look after the interests of the automobile industry to see that grave injustices are not done in this matter. Once out of the Senate Finance Committee, the measure next goes to the Senate for the vote.

Must Continue Battle Against Unjust 5% Tax

House Amendment Makes Tax Apply Only to Companies Earning 8% Plus \$5,000 on Capital

This Amendment Is Unsatisfactory Because It Heightens Discriminatory Nature of Tax

WASHINGTON, May 22.—The House of Representatives today voted as a committee of the whole to modify the 5 per cent tax on sales of cars, trucks and tires at the factory embodied in the war revenue bill by making it applicable only to the products of companies earning more than 8 per cent on the capital invested plus \$5,000. This amendment, proposed by Representative Doremus of Michigan, was adopted by a vote of ninety-six to ninety-two after the members had failed to agree to strike out the entire paragraph of the bill relating to the 5 per cent tax on factory sales of automobiles, etc.

The bill was also amended to provide that there shall be deducted from the tax on cars and trucks 5 per cent of the amount paid for the tires.

Dealers Must Pay

A committee amendment was also adopted which provides that the 5 per cent tax shall apply also to automobiles, trucks and tires in the hands of distributors and dealers on the day the revenue bill becomes law. When these have been bought by dealers and distributors since April 6, 1917, the tax is also to apply.

How greatly dealers will be affected by this provision is evident from the fact that since April 6 Detroit factories alone have shipped 214,000 cars to dealers. This represents millions of dollars investment and each dealer would have to pay \$20 to \$100 apiece tax on these cars without counting what he would have to pay in taxes on trucks and tires bought since April 6. With sales falling off this would mean unprecedented hard times for dealers all over the country and many would be forced to the wall.

Alfred Reeves, general manager of the National Automobile Chamber of Commerce, asserts that the automobile industry will continue to fight the tax; that the amendment adopted by the House in committee of the whole would not be acceptable to the industry, and that it would wage the fight to the end. Mr. Reeves said:

Keep On Fighting!

The House has recognized the injustice and discrimination of the proposed tax of 5 per cent on car, truck and tire sales and has tried to modify it. This is an added argument for completely eliminating such a tax from the war revenue bill when it comes before the Senate.

In the meantime, keep on fighting! Tax dealers are threatened by large losses and perhaps failure if the tax goes through. Manufacturers in all fields connected with the automobile industry will suffer.

War your protest to the Senate Finance Committee.

Industry Made Tax Target

Ways and Means Committee Singles Out Automobile, Truck and Tire Industries for 5% Tax.

Kindred Industries Not So Taxed.

The Industries Must Unite in Opposing this 5% Tax in the House, in the Senate Finance Committee and in the Senate.

Senate Finance Committee Will Hold Open Hearings on the Measure.

Manufacturers' Delegations Should Appear Before this Committee as Well as Waging a Fight on the Floor of the House and also in the Senate.

I.—The 5 Per Cent Tax.—Upon all automobiles, automobile trucks, automobile wagons, and motorcycles, a tax equivalent to 5 per cent of the price for which sold, provided that from the tax which otherwise would be imposed on a manufacturer, producer, or importer of automobiles, automobile trucks, automobile wagons, or motorcycles, there shall be deducted the tax on tires used on motor-boats, and other vessels NOT USED OR IN.

automobiles. They are all to be taxed alike, whether for trade or pleasure. It cannot be understood how industries should arrive at such an impossible conclusion.

Motor trucks are intended solely for trade use, yet they are put in the classification of the 5 per cent tax. On the other hand, motor boats intended for trade are exempt from the tax. We would like to know why automobiles, trucks, trailers and motor-boats, and other vessels NOT USED OR IN.

There are many reasons why automobiles, trucks, trailers and motor-boats, and other vessels NOT USED OR IN.

Industry Continues Fight.—The automobile industry protests against a tax on gross business as being discriminating and unscientific. It will continue its efforts to prove the truth of that statement to the lawmakers. It is ready to give up any part of its profits, but is against any plan that will have a tendency to make profits impossible.

The amendment adopted in committee of the whole still retains the 5 per cent tax, but proposes to exempt concerns that make less than 8 per cent on their invested capital exclusive of good will.

The industry is against it because it still discriminates against the automobile manufacturer and further discriminates among the automobile manufacturers themselves. The National Automobile Chamber of Commerce is making this fight with a view to having the automobile industry taken out of the class of face powder, perfumery, etc., and treated just the same as the

try toward the war excise tax in the early stages of the fight, before passage of the Emergency War Revenue Bill

various reasons it gives indication of depression and slackening, such as the automobile industry does today (1917).

One thing in particular which rankled the industry was that the Ways and Means Committee of the House, in its contemplation of the legislation, did not make any provision for a hearing at which the industry might present its arguments. Therefore, the N.A.C.C. and the Motor and Accessory Manufacturers' Association made the best they could of the situation; they wired their memberships to telegraph and write to every Representative and Senator in Washington protesting against the 5 per cent tax "because of its being discriminatory and class legislation, but also expressing a complete readiness to share an equal burden of war taxation with all other industries, and favoring the excess profit tax as modified to meet war needs."

It should also be mentioned that at this stage the industry was favorably inclined toward a gasoline tax, together with the excess profit tax, as a means of raising the war funds which it felt it should contribute, without resorting to the discriminatory sales tax.

Despite all opposition, the House Ways and Means Committee finally made a favorable report on the 5 per cent tax, but went even farther than

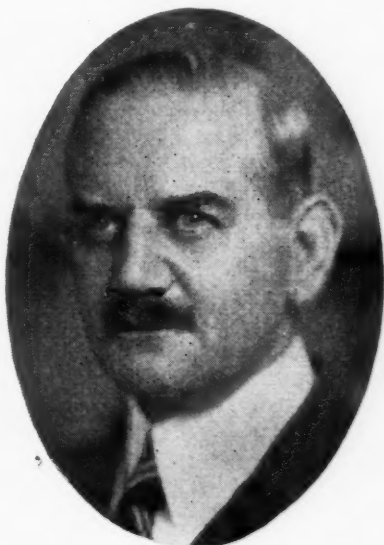
istration that a flat sales tax of 5 per cent be imposed on all motor vehicles sold to raise a portion of the \$1,800,000,000 annually needed for war purposes.

By this time the industry was fairly well organized for protection of its interests and voiced a protest against such a tax on the ground that it constituted class legislation and took the form of a poll tax on only a small percentage of the people. The industry pointed out that it was willing and anxious to stand its share of just taxation for the prosecution of the war, but that it objected to the particular form of tax which was proposed. Howard E. Coffin, who was a member of the Council of National Defense, issued a statement in which he said that the tax, in addition to the excess profits tax, which was expected to be increased, would not be equitable in any way, and especially in view of the support which the automobile industry was giving the Government.

The tax was referred to as class legislation and two major reasons for opposing it were given as follows:

1. The Government has no right to resort to class legislation which taxes one industry and not others.

2. It is poor policy to attempt to place class legislation burdens on an industry at a time when for



Alfred Reeves, general manager, N.A.C.C., was a continuous campaigner against the tax for more than 10 years

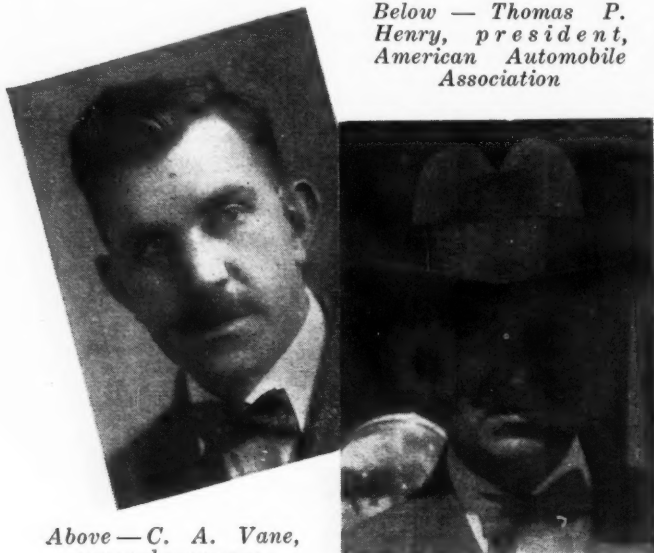
the industry expected when it extended the levy to include not only passenger automobiles and trucks, but also motorcycles and "automobile wagons," or trailers, as well as tires and inner tubes for automobiles, motorcycles and bicycles.

Taking its defeat at the hands of the House Committee as gracefully as possible, the industry now

sure which it was imposing on the industry.

Once during the debates which preceded the passage of the bill, the House proposed to make the 5 per cent tax applicable only to the products of automobile companies earning more than 8 per cent on the capital invested plus \$5,000. Later on the Senate Finance Committee, it was reported, would ditch the entire proposition as framed up to that time, and substitute a tax on passenger cars in the hands of owners, excluding trucks. It was suggested that this owners' tax would range from \$2 to \$25 per year, depending on the size of the machine. It will be remembered that this is the form of tax first recommended by Secretary McAdoo. Still later the Senate committee went on record unofficially as favoring a tax of 1 per cent on the price of passenger cars.

Too much time would be required to review all of the changes made in the plans before the tax bill finally became law. The issue dragged through the summer of 1917 and by the latter part of September it became fairly evident that Chairman Claude Kitchin of the House Ways and Means Committee was holding the whip hand and that he proposed to drive through a tax of 3 per cent on the wholesale price of all motor vehicles. Such proved to be the case; the War Revenue Bill with this provision became effective on Oct. 4, 1917.



Below — Thomas P. Henry, president, American Automobile Association

Above — C. A. Vane, general manager, N.A.D.A.

These men and their organizations did much to create sentiment for repeal of the tax

prepared to shift the scene of its activities to the Senate Finance Committee. Here it was to get slightly more consideration than was its portion at the hands of the Ways and Means Committee. The Senate Committee agreed to give it one hour on May 12, 1917, to present its views on the measure, with the stipulation that the argument for the entire industry would have to be given by one representative to be selected in advance by the manufacturers.

During this period Mr. Reeves and other automotive leaders were virtually camping in Washington, using every means at their command to emphasize on Congress the unfairness of the proposed tax.

A lucid picture of the industry of that day is found in one sentence of an exhaustive brief which was prepared by Mr. Reeves: "There are 450 automobile makers (cars and trucks) in the United States, of which 12 makers produce 80 per cent and 438 produce 20 per cent of the whole." Another sentence stated that "The automobile industry comprises approximately 450 manufacturers and 825 makers of parts and accessories; there are 25,924 dealers and 23,686 garages throughout the country."

The Senate Committee Hearing

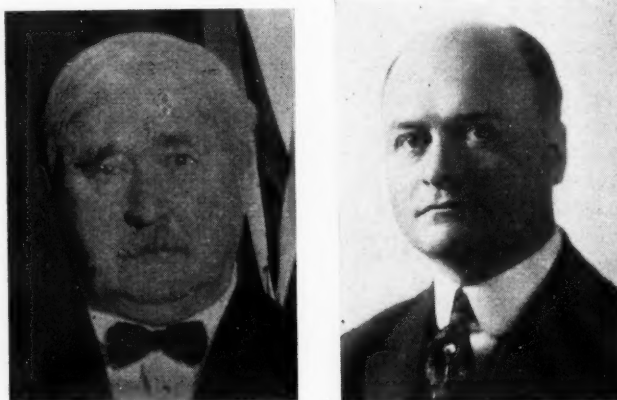
When May 12 came around the time of the industry before the Senate Finance Committee was cut to 40 minutes, but several addresses against the tax, instead of one, were heard. The main statement was presented by Mr. Reeves. Then followed shorter arguments by Thomas Henderson, of Winton; Elwood Haynes; F. I. Burrows, of Lexington-Howard; Dr. E. C. Crow, of Crow-Elkhart, and A. B. C. Hardy, of Chevrolet. The committee seemed very sympathetic to the importunities of these representatives and after the hearing hope was entertained that important changes might be made in the bill to relieve the pres-

Tax Jumped to 5 Per Cent

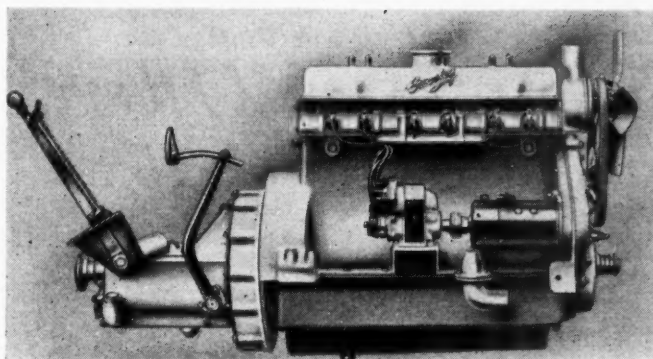
A year and a half later, in February, 1919, the law was changed, much to the dismay of the automotive industry, to provide for an increase in the tax to 5 per cent, and a similar amount was levied on tires, parts and accessories. For more than five years this tax remained, the industry throughout this period continuing a vigorous offensive against the burden.

The N. A. C. C. and the M. & A. M. A. have already been mentioned as two organizations arrayed against the tax. Others which must share whatever glory attaches to the fight on behalf of the industry are, the American Automobile Association, American Farm Bureau Federation, American Drivervelf Association, Automobile Body Builders Association, Automotive Equipment Association, National Association of Taxicab Owners, National Automobile Dealers Association, National Battery Manufacturers Association, National Grange, Rubber Association of America, American Motorists' Associations, and the Chamber of Commerce of the United States.

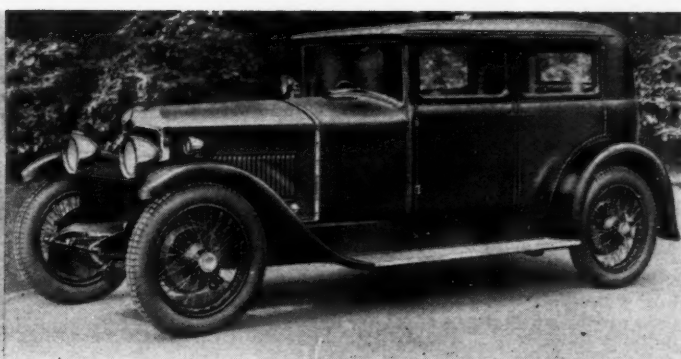
During the latter part of 1923 and the early months
(Continued on page 883)



Two leaders in the early fight against the tax were the late Elwood Haynes (left) and A. B. C. Hardy, who was then an executive of Chevrolet



Right-hand and left-hand sides of the powerplant of the new Crossley Six



Fabric sedan as fitted to new Crossley Six chassis; only type of body at present offered

Lighter Six With *Overhead* Valves *Introduced* by Crossley

New British offering has two-liter engine with unit four-speed gearset and magneto ignition. Fabric sedan model sells for £550. Weighs 2900 lb.

By M. W. Bourdon
British Correspondent

THE six-cylinder British Crossley car introduced at the 1926 Olympia Show with a three-liter engine has been supplemented by a new six-cylinder model of approximately two liters (1991 cc.), the bore and stroke being respectively 65 by 100 mm.

Overhead pushrod-operated valves inclosed by a cast-aluminum cover are employed, while, departing from the general trend of new models of this type introduced at Olympia in October last, magneto ignition is used, the magneto being driven in tandem with the spigot-mounted generator, which in turn is driven by chain distribution. The spark plugs are fitted at an angle of 45 deg. on the same (right-hand) side of the engine.

The cylinder block is a cast-iron unit with the upper half of the crankcase. The latter is in two sections, consisting of an aluminum unit with a pressed-steel full-length sump. To the upper and main lower sections of the crankcase is bolted the aluminum bell-housing of the flywheel, with the gearset forming an integral extension. The powerplant is four-point suspended in the main frame.

Lubrication is forced throughout by a submerged gear type pump with delivery through exterior leads to the overhead valve gear and distribution. The crankshaft, drilled for lubrication, has balance weights and four bearings; the camshaft, also with four bearings, runs submerged in an oil bath. Water circulation is maintained by a pump at the rear end of the fanshaft, which is driven by a V-belt from the camshaft. A Zenith carburetor is used with a straight induction manifold of round section and an upward plate extension making contact with the exhaust manifold; the latter has its downtake at the front end. The starting motor extends rearward from the flywheel casing and has a Bendix drive.

The four-speed gearset is provided with right-hand control, the lever operating in a gate. A single-plate

clutch, open propeller shaft and Hotchkiss drive have been adopted in conjunction with a semi-floating rear axle with spiral bevel drive having a ratio of 5 to 1, the differential housing being bolted to a pressed steel axle casing. The first, second and third speed ratios are respectively 18.95, 12.6 and 7.95 to 1, the reverse being the same as the first speed forward.

Suspension is by semi-elliptic springs throughout, the rear ones being under-hung; all have frictional one-way (Smith) shock absorbers. The front axle is of H-section between the spring seats and oval outward to the swivel heads. The braking equipment consists of four sets of expanding shoes in the wheel drums actuated by pedal and two additional seats in the rear wheel drums, lever-operated. The layout of the front brakes provides automatic release of the inner shoes on corners. Rudge-Whitworth wire wheels are standard with 4¾ in. medium pressure Dunlop tires for 21 in. wheelbase rims. Worm and worm wheel steering is fitted, with ball and socket joints throughout, the steering gear housing being elevated well above the frame on a pedestal bracket, an arrangement giving a steeply raked steering column.

Straight in plan, the frame has a kick up and down over the rear axle, above which is the fourth pressed-steel cross-member from the front; both front and rear dumb irons are joined by tubular cross members, the front one supporting a permanently fitted coupling shaft between the crankshaft and the detachable starting handle.

The wheelbase of the chassis is 123 in., the track 56 in., overall width 67 in., overall length 166 in., and minimum ground clearance 9½ in. On the right-hand lock the turning circle is 41 ft. 6 in., and on the left-hand lock 40 ft. 6 in.

The standard fabric sedan body is offered in blue, black or prune, with black, primrose or red wheels. The price of this model is £550. It weighs 2900 lb.

Many *Production* Advantages Offered by Normalized Steel

Can be used with beneficial results for crankshafts, front axles, connecting rods, etc. Absence of strains makes it unnecessary to resort to cold-straightening.

By C. N. Dawe

Manager, Automotive Division, Vanadium Corp. of America

THE change in practice from heat-treating to normalizing operations for certain vital automotive parts, such as crankshafts, connecting rods and front axles, which is being introduced by the Vanadium Corp. of America, entails a thorough knowledge of the behavior of all steels when subjected to such normalizing operations. At first thought it might be assumed that if the quenching and drawing operations were done away with, almost any steel that would produce the necessary physical properties and hardness would be satisfactory, and the natural tendency would be to go to the steel of lesser cost.

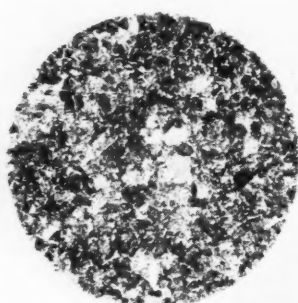
In promoting this radical change in production practice, the Vanadium Corp. feels that carbon vanadium steel is the ideal normalizing steel. What the producer of automotive parts expects and strives to obtain in his heat-treating operations is uniformity of product, and he must expect to obtain this same uniformity in his normalizing operations. It might be thought that this

uniformity should appear in all steels if simply annealed or normalized, but this is far from being true.

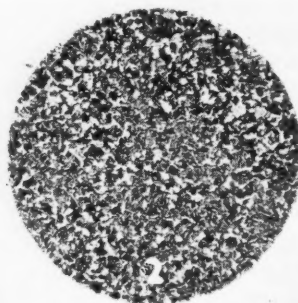
For crankshafts a certain hardness and certain physical properties must be obtained, and an alloy steel of some type is desirable. Because of possible variation in rates of cooling that may be encountered from one end of the year to the other, as a result of changing weather conditions, etc., any element that has a tendency toward "air hardening" should be avoided.

The commercial alloy steels that would naturally be considered are straight nickel steels, chrome nickel steels, straight chrome steels, chrome-molybdenum steels, nickel-molybdenum and high manganese steels, aside from the chrome-vanadium and carbon-vanadium steels.

Microphotographs of Various



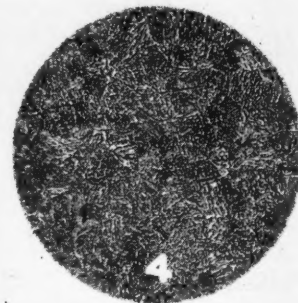
C—0.47
Cr—0.70
Ni—1.18



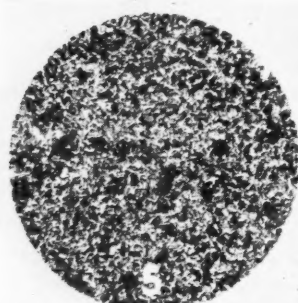
C—0.35
Cr—0.82
Mo—0.22



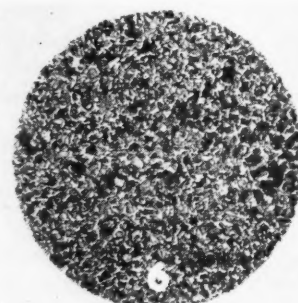
C—0.52
Cr—0.94
Mo—0.31



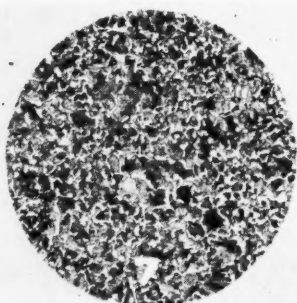
C—0.40
Cr—1.07
Mo—0.34



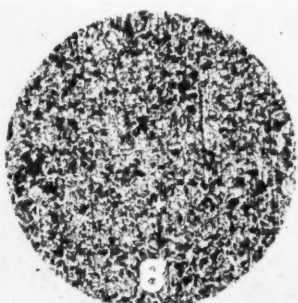
C—0.52
V—0.19



C—0.49
V—0.19



C—0.49
V—0.16



C—0.53
V—0.23

There are certain requirements or properties that the consumer must demand when using a normalized steel on a production basis, the principal ones being:

1. Physical properties.

2. Hardness

and uniformity of hardness.

3. Uniformity and ease of machining and drilling.

If physical properties were the only requirement, several types of steel would answer the purpose. In dealing with automotive crankshafts—to which this article refers particularly—a minimum elastic limit of 70,000 lb. p. sq. in. should be obtained, after heat treating or normalizing (as the case may be). Satisfactory values for the ultimate strength, elongation and reduction of area will naturally follow in the type of steel that would be considered, whether heat treated, that is quenched and drawn, or normalized.

Tests performed on various types of steel in the normalized state and of such analysis as to produce the minimum elastic limit of 70,000 lb. p. sq. in. are given below. These tests were made on steel bars which had been forged and normalized as the parts would be on a production basis.

It is a common experience that results of tensile tests performed on a set of test specimens will show considerable variations. The results given in Table 1

TABLE 1
Composition and Physical Properties of Alloy Steels

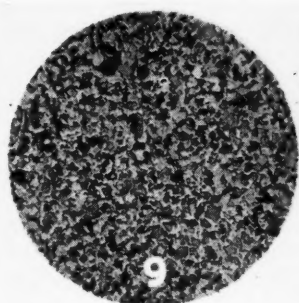
| ANALYSIS | | | | | | El | Ult | Elong. | Red. of Area | Brinell |
|----------|-----|-----|------|-----|-----|--------|---------|--------|--------------|---------|
| C | Mn | V | Ni | Cr | Mo | | | | | |
| .49 | .80 | .18 | | | | 75,000 | 160,250 | 28.5 | 60.1 | 207 |
| .43 | .72 | | | .59 | | 57,150 | 108,550 | 19.0 | 45.3 | 207 |
| .47 | .68 | | 1.18 | .70 | | 68,400 | 120,600 | 19.5 | 55.2 | 252 |
| .52 | .57 | | | .94 | .31 | 86,200 | 142,500 | 18.0 | 59.4 | 309 |
| .45 | .89 | | 1.80 | | | 65,000 | 118,250 | 23.0 | 54.8 | 217 |

were obtained on a given test specimen and represent an average of what may be expected. The table also shows that if physical properties alone were used as a basis for adoption any one of the types could be consid-

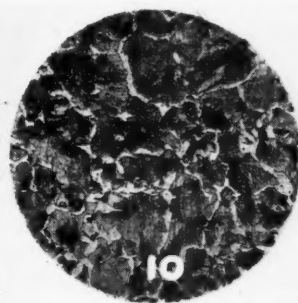
ered. In the case of the straight chrome steel, a higher carbon content and, possibly, a little higher chromium content would bring the elastic limit up to requirements.

It is interesting to note, however, from the values obtained in these particular tests that the Brinell hardness is quite misleading as an index of the elastic limit. As has been pointed out many times in other papers, but it does follow the tensile strength fairly closely. It is also very interesting to note that any steel containing chromium, either alone or in combination with another element, and normalized, has a considerably greater hardness than a similar steel free from chromium and which has an equal or greater elastic limit. Note also the greater hardness of the the straight nickel steel as compared with the carbon vanadium, even with a considerably lesser elastic limit. This brings out very clearly the air hardening tendency of nickel and chromium alloys—a property very much to be avoided in normalized steels for production purposes. The speed of air cooling, which may be affected by weather conditions, will vary the properties of these types of steels accordingly. The same condition exists with so-called high manganese steels, as has been proved a number of times where this type of steel has been used for air-

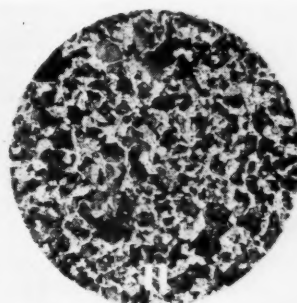
Normalized Alloy Steels



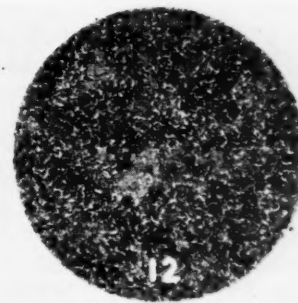
From Crankshaft
C—0.42
V—0.17



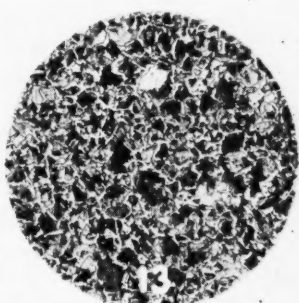
From Crankshaft
C—0.43
Cr—0.59



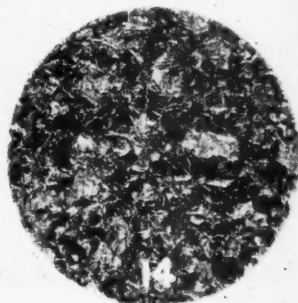
From Crankshaft
C—0.27
Cr—1.03
V—0.11



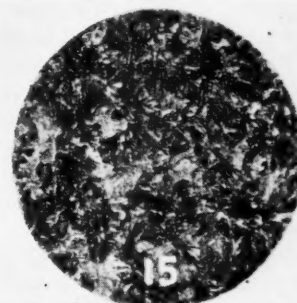
From Crankshaft
C—0.56
Cr—0.30
V—0.17



C—0.40
Cr—0.52
Mn—1.04



C—0.46
Cr—0.64
Mn—1.23



C—0.46
Cr—1.06



C—0.50
Cr—1.04

cooled connecting rods and crankshafts on a production basis. The variation in hardness and possible segregations make uniform and easy machining an impossibility.

The machining of straight nickel steels, air cooled, and which will show a minimum elastic limit of 70,000 lb. p. sq. in. and a corresponding Brinell hardness, is also quite out of the question. Those experienced in the handling of straight nickel or chrome-nickel transmission gear stock know only too well that very careful annealing processes are demanded to produce forgings that will machine readily. Air cooling is, of course, out of the question. A maximum Brinell hardness of 207 is generally sought, and very slow cooling from above the critical range is necessary to obtain this. Machining of 2 per cent nickel steel in normalized crankshafts has been experimented with without success.

Molybdenum Steels

In the case of molybdenum steels, Gillet and Mack* with the aid of data supplied by French, prove that these are no better than the plain carbon higher manganese steels in the normalized condition. They say, further, that if we compare the hardened and tempered steels the strengthening effect of the molybdenum in the heat-treated condition is evident, but the data brings out the fact that in the normalized condition steel containing molybdenum is generally no better and may be poorer than in its absence.† Owing to the wide temperature range between the critical points on heating and cooling, molybdenum steels of suitable composition have a tendency to be air-hardening. This effect of molybdenum is quite pronounced. Vanadium does not have such a tendency, and so in this respect the two elements are not equivalent. Vanadium steels are characterized by exceptional fineness of grain. Either the trace of vanadium in the ferrite obstructs diffusion, or the vanadium-bearing cementite can diffuse less readily, so that the sorbite of vanadium steel tends to be finer, with less agglomeration of cementite and separation of ferrite than without the vanadium. This fine grain is undoubtedly the reason for the high elastic ratio of vanadium steel, being higher than that of most other common alloys.

Does Not Air-Harden

However, one of the important advantages of vanadium in connection with the particular subject under discussion is that it does not confer marked air-hardening properties. Normalized plain vanadium steel has found considerable application in complicated shapes, such as motor crankshafts and many locomotive forgings which must show a high elastic limit without heat treating, since the latter causes distortion and a tendency to crack.

If the steel were wholly or partly air-hardening, normalizing would produce a material of lower elastic limit. Concrete examples of this are shown in Chapter IX of Gillet and Mack's treatise on "Molybdenum, Cerium and Related Alloys." They show also that carbon vanadium steels are noteworthy for giving better results in the normalized condition than can be obtained from normalized carbon steel, and that commercial chrome-molybdenum steels are obviously less suited for such a purpose.

Microphotographs of the various types of steel, after normalizing from 1650 deg., are shown herewith, and the marked uniformity of fine grain and sorbitic struc-

ture of the carbon vanadium steels are pronounced, as compared with the grain structures of the other grades.

The question now is, to what advantage can normalized steel be used in automotive crankshafts.

For those as yet unacquainted with this development, it may be stated that crankshafts are forged in the usual manner, after which they are heated to a normalizing temperature of 1650 deg. Fahr., removed from the furnace and immediately struck in a die and air-cooled in suitable racks. After the customary cleaning operations, the cranks are ready to be machined, no further heat treatment being necessary. The physical properties and hardness of carbon vanadium steel crankshafts, in this normalized condition, are in every way up to specifications, and the machining properties are superior to those of the present heat-treated crankshafts. By virtue of the fact that the cranks have not been subjected to any quenching operations they are free from drastic cooling strains and, as a result, will require no cold-straightening operations during machining. Internal strains are multiplied by cold straightening, and these normalized crankshafts when assembled in the engine will be within the limits of accuracy exacted by the machine shop, as rough handling or aging will not distort them in any way.

This same method may be followed with other parts, such as connecting rods, front axles, and, in fact, any parts which have been considered to require heat treatment to obtain the necessary physical properties. Heat treatment which produces strains that may result in quenching cracks, warpage, etc., has always been a necessary evil in automotive production up to the time of the present development, and many advantages may be gained by the use of a normalized steel.

These advantages extend even to the user, for the normalized crankshaft retains its shape in service for an indefinite period and relieves the bearing of the undue pressures that "strained" cranks invariably create. The uniform oil film always existing between bearings and pins, because of the absence of such undue pressures, together with the added wearing properties of the fine-grained alloy steel, minimize wear to the utmost.

The chief advantage, however, of this type of crankshaft is in connection with production and the normalized carbon vanadium crankshaft already has been adopted by two leading motor car manufacturers.

The microphotographs reproduced herewith were 100 diameters and in reproduction were reduced in the proportion of about 3 to 2. They were taken at the research laboratory of the Vanadium Corp. of America, Bridgeville, Pa.

Ryan-Siemens Engines

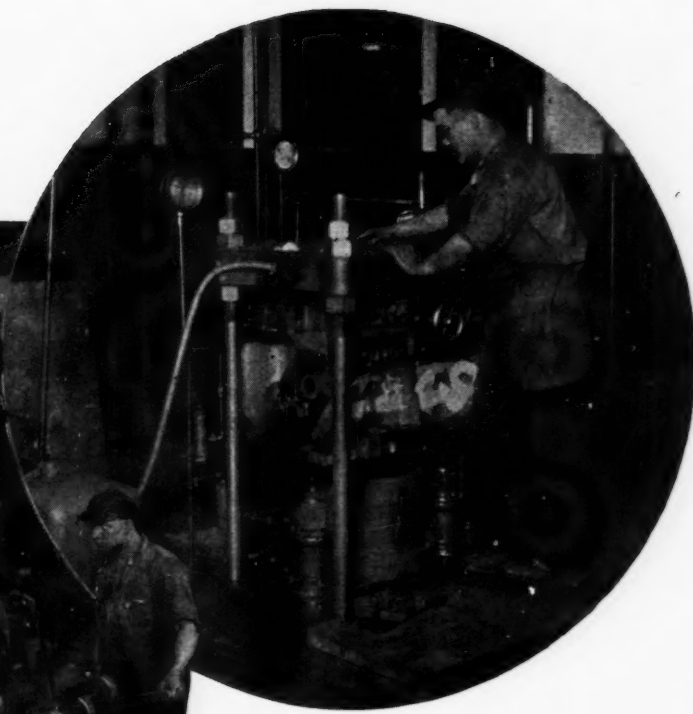
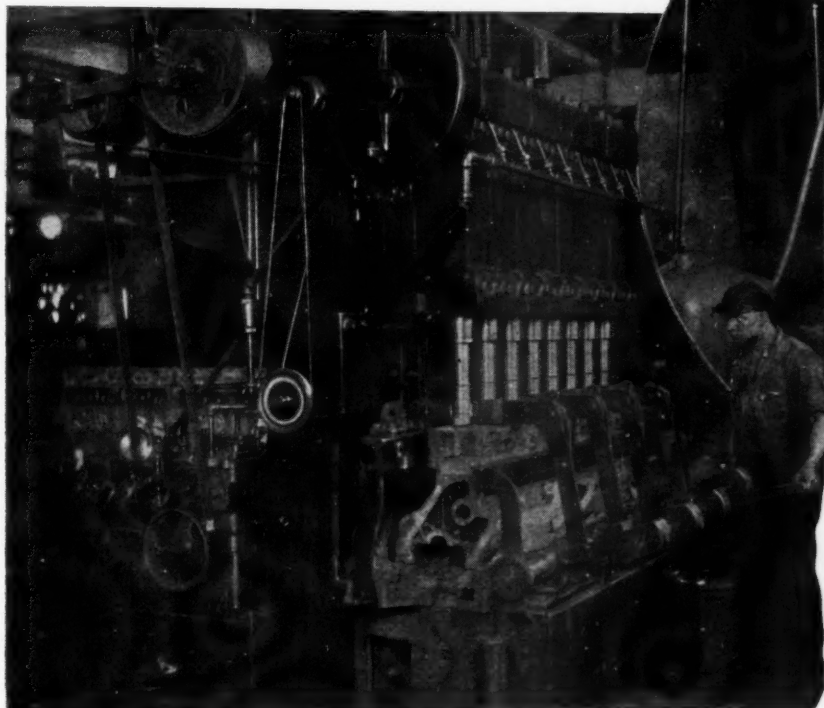
IN an article a few weeks ago on the All-American Aircraft Show at Detroit, reference was made to the Ryan-Siemens engines. It was not made clear, however, that these are marketed by the Ryan Aeronautical Corp., which is not associated with the B. F. Mahoney Aircraft Corp. any longer, the partnership between Mr. Mahoney and Mr. Ryan having been dissolved some time ago.

The B. F. Mahoney Aircraft Corp. is now engaged exclusively in the manufacture of Ryan airplanes, while the Ryan Aeronautical Corp. is engaged solely in the distribution of engines, there being no affiliation between the two concerns. At the aircraft show, the latter company exhibited its nine-cylinder engine, the booth being in charge of W. H. Bowlus, service manager.

* Gillet and Mack: "Molybdenum, Cerium and Related Alloy Steels," p. 60.

† Gillet and Mack, p. 63.

Barrels of Lycoming cylinder blocks are rough bored in Moline Hole-Hogs. The fixture has rails along which the work is slid, disappearing locating points and the work is held by the weighted levers shown



The water test is oil gear controlled to provide accurate regulation of pressures

Editor's Note

This article is in two parts. Part II will appear in an early issue.

Modern Equipment *Cuts* Cylinder Block *Production* Costs

Labor requirements reduced 50 per cent in machining of six and eight-cylinder engine blocks at Lycoming plant by installation of latest tools designed for work.

By K. W. Stillman

A NEW production line with the most modern equipment has recently been placed in operation at the Williamsport plant of the Lycoming Mfg. Co., for the manufacture of cylinder blocks for six and eight-cylinder-in-line engines.

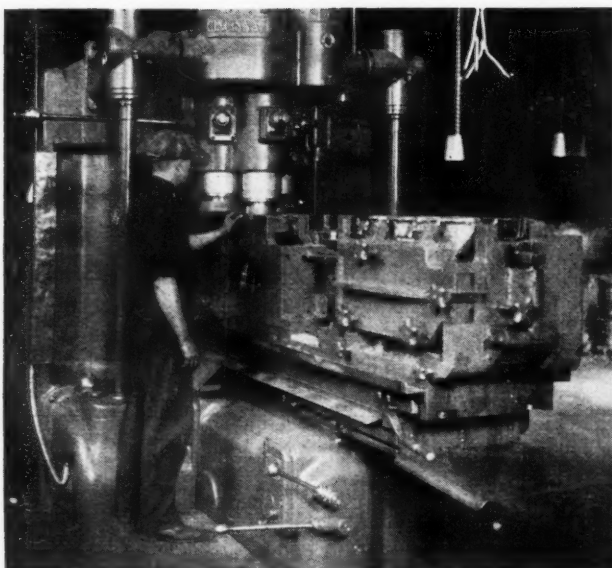
Practically every machine used in the line is new, or not more than a year or two old. In fact, a number of the machines in use were first offered to the public for sale at the Machine Tool Builders Show at Cleveland last fall. Nearly half of all the tools have hydraulic drives and every machine in the line-up has individual motor drive.

A direct comparison of the results of this modern installation is possible because right beside it is another production line, also turning out cylinder blocks for six and eight-cylinder engines, which is equipped in a more usual manner. That is, the machine tools used are of all ages and types. A few new machines are assisted

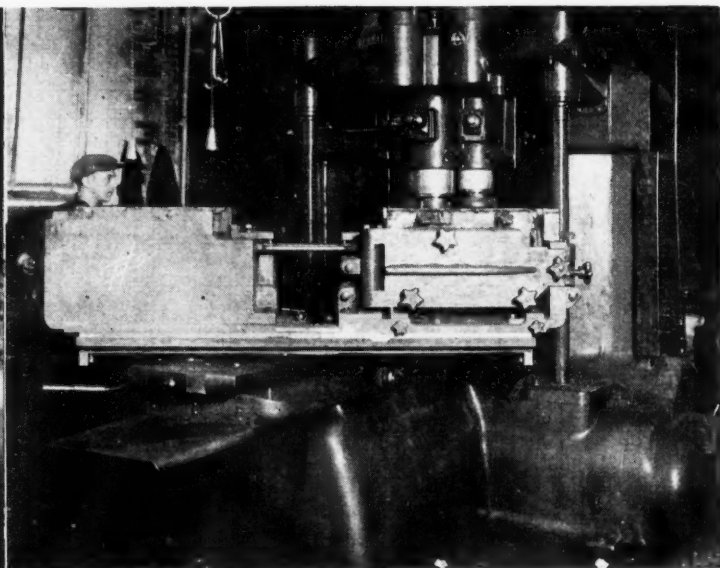
by some of considerable age and a mixture of individual motor drive and countershaft driven machine being included. In short, this line is fairly typical of the usual line-up to be found in a modern plant.

For an average production of 10 completed cylinder blocks per hour the old line requires 62 men. For the same production the new line requires 34 men, almost a 50 per cent reduction in labor cost. Space requirements for the new line are less and, when it has been in operation long enough to have all its minor difficulties ironed out, it is expected to provide even greater economies than it does at present.

The first eight operations, including milling of oil pan face, bearing locks, top, water back, tappet cover face, support pads, front and rear ends; rough and finish boring and reaming barrels and drilling and reaming of locating holes are performed by five men for a production of 10 pieces per hour.



One of the three Cincinnati Hydromatic milling machines used to mill Lycoming cylinder block surfaces



Detail of the indexing table fitted to the Hydromatics by means of which all loading and unloading is performed during machining time

The first, second and fourth operations are performed on Cincinnati Hydromatic milling machines equipped with automatically-controlled, hydraulic drives. The oil pan face and the bearing locks are rough milled in the first operation. The Hydromatic is equipped with three spindles and a 180 deg. indexing table fitted with two holding fixtures so that all handling of castings, loading and unloading are done during time of the milling.

The adjustable feeds made possible by the hydraulic drive of these machines are utilized fully in all three machines to make the feed at each instant the best for the particular conditions encountered. In the first operation, the vertical spindle carries a cutter having both end and side milling teeth. As the tool enters the work only the end mills are engaged on the oil pan surface, so the feed is fairly rapid. As the bearing locks are approached the side mill comes into action and, automatically, the feed is diminished to care for the heavier load.

Feed Adjusts Itself

When the first bearing lock is passed the feed is again increased until the next lock is reached. By proper formation of the cams which control the feed, any combinations can be obtained so that at each instant the feed is that most desirable for the work being done.

Blocks from the first Hydromatic are transferred by air hoist to the second milling machine beside it where the top, water back, manifold, tappet cover face and right front support pad are milled and the left front support arm straddle milled. This machine is equipped with five spindles and has the same type of indexing fixture.

An Aurora drill, a 24-in. single spindle column type, fitted with an open quick-clamping jig with a slip bushing, is brought into play for drilling and reaming the locating holes, after which the work proceeds to the third Cincinnati Hydromatic.

This machine is fitted with four milling spindles and in it the oil pan face, bearing locks and fuel pump pad are finish milled. Here again an indexing table with two work-holding fixtures is employed so that no loss of machining time is occasioned by loading or unloading.

The tappet cluster bosses are then milled on a Milwaukee miller equipped with a Kearney & Trecker four-

spindle head. The fixture is of the flat open type, of angle iron, and has disappearing locating pins which engage the locating holes in the cylinder block. A cam action clamps the work through the end barrels.

A Cincinnati semi-automatic duplex milling machine is next used to mill the front and rear ends and the fan bracket pad. Fixture and means of locating and clamping are the same as those used in the previous operation.

The barrels are rough bored in a Moline eight-spindle Hole Hog equipped with Oil Gear drive. The blocks are slid along rails through which disappearing locating points protrude to engage the locating holes in the block. The block is clamped simply by weighted lever action clamping devices. No pilot bushing is used on this or on the next finish boring operation.

The barrels are finish bored and semi-finish reamed in another Moline Hole Hog, the blocks being slid along the rails from one machine to the next after the locating points have been depressed.

As mentioned previously, all these eight operations described are accomplished by five men with an output of 10 blocks per hour.

Two men run the three machines required in the next three operations, the fixtures, of the shelf type, being mounted on rollers so that after a setting up the work for the first operation no time is lost in preparing it for the two following.

A 16-spindle Natco multiple drill is employed first for rough boring the valve throats and spot facing the valve seats. This machine, as well as the two next in line, has two working positions. In the first the intake valves are bored and in the second the exhaust valves. The boring bars are piloted through a bushing plate which rides the machine head and is located by means of guide pins on the fixtures.

A 32-spindle Natco is employed next to semi-finish bore the valve throat and to spot drill and drill the valve stem guide holes.

The third operation of this group performed by two men is to flycut the valve stem guide holes, finish bore the valve throats and semi-finish ream the valve stem guide holes. Another 32-spindle Natco is employed.

A water test follows and even this is hydraulically operated to insure a definite and constant pressure for closing the openings in the cylinder block.

Just Among Ourselves

Pity the Driver In Low Speed

THERE is a flavor of interest and romance to the earlier days of the automotive industry that won't down however much one mulls over the old records and the old ideas. P. M. Heldt, who himself has had an important part in the making of automotive history, dug up the following interesting quotation the other day from the 1892 catalog of Panhard & Levassor, the first firm to build gasoline automobiles in France: "Speeds: The cars have three speeds, a small speed, an intermediate speed, and a high speed. The high speed is generally adjusted to 11 m.p.h. In level or slightly rolling country, and particularly with the two-passenger model, it is possible to attain higher speeds, up to 12½ m.p.h.; but these high speeds call for the closest attention on the part of the operator and are not always to be recommended. The low speed is used on hills and on poor sections of road."

* * *

Thinking in the Absence of Facts

RAN across an apt expression of a common failing the other day while reading Dr. Morris Fishbein's "Medical Follies." Discussing the methods of a certain healing cult he says, "The explanation offered . . . is very simple, and hence well calculated to attract the minds of those who like to think for themselves in the absence of facts." Here we would seem to have in a nutshell the difference between the leader of men and the mere boss; the difference between the capable executive and the merely strong-minded, obstinate man. Much progress is lost, without doubt, because a lot of us are pretty

lazy mentally; but much is impeded by such virile, active minds as feel the necessity of arriving somewhere quickly but are too slothful to seek and analyze all of the facts before embarking for their goal. And, incidentally, having nothing whatever to do with the automotive industry, we recommend Dr. Fishbein's book as one of the most engrossing we have read since "Microbe Hunters."

* * *

Education as a Means of Building Future Market

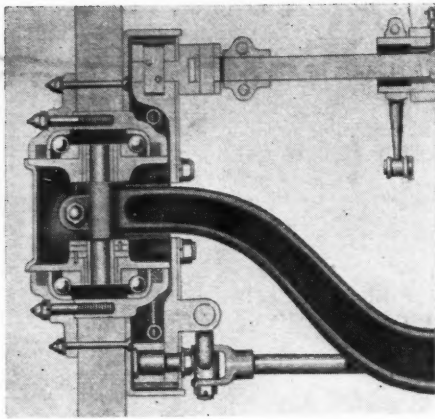
HAS the time come for a completely new and permanent mental approach to the fundamental problem of adjustment of supply and demand so far as the automotive industry is concerned? For years we have been thinking almost wholly in terms of production and selling; we have been looking from the inside out. We are now in a buyers' market. We have been in that market for some time and there is every indication that we will be in such a market almost indefinitely in the future. Accepting that premise—and it can be proved sound—it becomes obvious that neither production nor sales pressure is our problem. Sales pressure doesn't create any more market; it just changes the distribution of sales within a given market. Education of the user, then, looks like the only reasonably permanent way out. Every factor within the industry must involve itself in educating the user of automotive products in new ways and more ways to use those products. Greater use of secondary roads, for example, might make motoring more pleasant and thus encourage greater use of cars and other automotive products. Adult user education and its funda-

mental possibilities as a foundation for a basic, broad dynamic automotive program for the future is worth some serious consideration from the most important men in the business. We will have some more to say along this line before very long—and we hope you'll be interested.

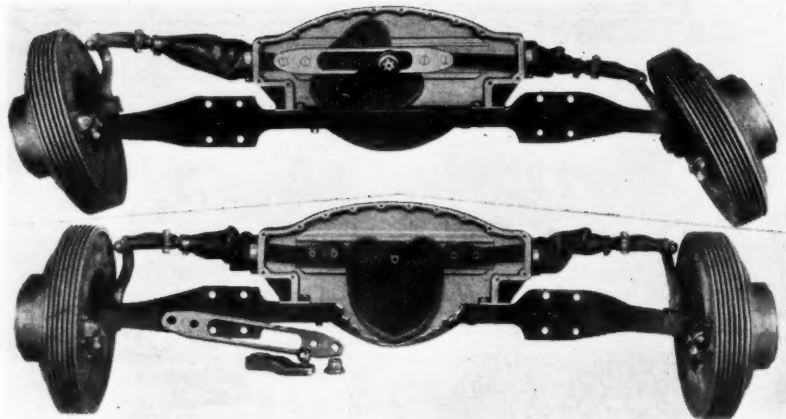
* * *

Merger Rumors in Wall Street

NEARLY every producer in the passenger car field has featured in one or more merger rumors current on Wall St. in the last week. Some of these rumors we have been able to track down and assure ourselves beyond shadow of a reasonable doubt that they are false so far as current negotiations are concerned. Dubois Young, president of Hupp Motor Car Co., for example, says definitely that Hupmobile is not involved in any merger transactions. High officials of several other independent companies approached confidentially stated no less definitely that no merger negotiations were being conducted. Definite offers have been made in the last two years by important interests for one or two of the outstanding successful companies among the independents; those offers were considered and turned down as not being as attractive from a financial standpoint as continuing to stay in business as individual companies. Further offers probably will be made within the next year or two, but an offer is a long way from a merger or a purchase, particularly where the negotiations constitute what in bridge is said to be "leading into strength." These seems to be little doubt, however, that there is going to be another merger before long.—N.G.S.



Sectional view of Frederickson
center pivot steering axle



Two views of the Frederickson anti-shimmy steering linkage

Spindle-less *Mounting* Used in New Front *Axle* Assembly

Damping out of wheel wobble and road shocks among advantages claimed for Frederickson design, which is to be marketed for original equipment. Makes for easier steering.

A NEW front axle assembly including spindle-less mounting of wheels and steering linkage that damps out shimmy and road shock is now ready for the original equipment market, it is announced by the No-Spindle Axle Co., 1926 S. Wabash Ave., Chicago. C. E. Frederickson, who has been connected with various branches of the automobile industry for a long time, is the inventor.

The axle center is an I-section drop forging, and only the axle ends are of unconventional design. A vertical pivot pin is clamped in split eyes, with its axis in the center plane of the wheel. It serves as a pivot for a steering hub of malleable iron, with steel bushings. This hub is provided with a flange on each side of the pin bushings, on which are fitted ball bearings of $4\frac{5}{8}$ in. bore and $6\frac{1}{2}$ in. outside diameter. Outside each bearing there is a packing ring groove. The wheel hub fits over the steering hub, with the two ball bearings between them. Thrust washers are placed over the lower bearing of the 1-in. steering pivot pin to take the thrust load.

Wheel Hub in Two Sections

A pair of parallel rings are slipped onto and tightly engage each steering hub flange and form the inner races for the ball bearings. The wheel hub structure consists of two sections, each formed with an inwardly extended annular rim which bears on the steering hub through the ball bearings, and each of which has an annular groove in its bearing face for the reception of the felt washer. The two wheel hub sections are secured together by cap screws. The outer half of the wheel hub can be shaped to adapt it to receive wood, disk or wire wheels.

Caster is obtained by mounting the pivot pin in steel-bushed bearings slightly forward of the center line of the steering hub. Neither camber nor rake is provided

in this axle construction and only about $\frac{1}{8}$ in. of toe-in is used.

Larger pivot pins and larger bearings (both of the same size), and the fact that the main section of the axle is extended to the center of each wheel are given by the inventor as the reasons for the easier steering, longer tire life, stronger assembly as a whole and elimination of wheel wobble, which he claims to be advantages of his axle.

Rocking Doesn't Affect Wheels

"Rocking of the axle by spring action does not affect the wheels," says Mr. Frederickson, "because the axle rocks in the bearings of the wheels. With the conventional cambered axle rocking causes the pivot to move in a fore and aft fashion, which, combined with the camber, sets up wheel wobble."

The usual steering knuckle arms are secured to the wheel hub and are connected to cross links. At their inner ends these links are connected by pins to spaced guide links assembled on shouldered pins and mounted between guides in a cam housing. A similar guide is formed in the cover of the cam housing which latter may be secured to the front axle by welding or bolting.

A heart-shaped cam for operating these links is keyed to a shaft which extends through slots in the guide links. The shaft is operated by a lever arm which is keyed to it, and which is connected by means of a conventional drag link to the steering column. Cam followers bear on opposite faces of the heart-shaped cam, and when the cam is turned both links are forced to one side, thus turning the wheels.

In order to prevent shimmying at high speeds when the wheels are in nearly central position, the cam is so designed that the followers bear squarely on the cam surfaces under these conditions. Any lateral motion of the front wheels tending to produce shimmy or trans-

mit shocks from the steering links back to the steering column and wheel will be absorbed on the surface of the cam, since the cam followers then act on a portion of the cam which tends to produce no rotary motion of the cam.

With the center steering device attached to the spindle-less axle, the wheels are locked in the center position and for approximately 12 deg. to both sides of the center, depending upon the exact shape given to the lobes of the cam. The inventor does not consider that it would be safe to thus lock the wheels with the conventional type of spindle, as this type would be more susceptible to breakage from repeated shocks. It is claimed, moreover, that accurate concentric steering is obtained with this device throughout the range of steering wheel deflection, whereas with the ordinary steering mechanism this is obtained at only one or two points of this range.

10-Year Tax Fight Ends

(Continued from page 874)

of 1924 these organizations massed themselves for a fresh drive against the tax. They demanded its repeal, still holding to the argument that it was discriminatory, the more so in that the excise tax on other commodities, bowling alleys and billiard tables, for example, were being lifted while Congress was reluctant to grant relief to motor vehicles, which were distinctly more essential to the welfare and prosperity of the nation.

An episode in the fight at this time was a statement by Senator James Couzens of Michigan, during a debate with Senator Reed of Missouri, that the automotive industry wanted to have the surtax removed rather than the 5 per cent excise tax, because the latter was passed on to the consumer while the manufacturer had to shoulder the surtax himself. This brought sharp denials from seven prominent executives in the industry—Alvan Macauley of Packard, Charles Mott of General Motors; Richard H. Scott of Reo, Roy D. Chapin of Hudson-Essex, H. H. Rice of Cadillac, H. M. Jewett of Paige-Detroit, and F. J. Haynes of Dodge Brothers.

These men joined in a telegram to Senator Couzens which stated: "If Congress is to make a reduction in any excise taxation we ask you, as representing the State of Michigan, to work for the repeal or a similar reduction of the excise tax upon motor cars, trucks and repair parts and to have the record cleared and corrected so far as the attitude of our industry is concerned."

The automotive industry got its first "break" in the long fight on the tax when Congress in July, 1924, reduced the 5 per cent tax on tires, parts and accessories to 2½ per cent, and exempted entirely motor truck chassis having a wholesale price of \$1,000 or under and all bodies therefor having a wholesale price of \$200 or under. This meant a substantial saving to the industry and the public, but was important chiefly in that it represented a change of sentiment on the part of Congress toward the whole subject of automobile taxation.

With this victory to its credit, the industry attacked the remaining taxes with renewed vigor. In February, 1926, it succeeded in having removed the 2½ per cent remaining on tires, parts and accessories, and the 3 per cent on trucks. In March of the same

year one of the last remaining stones in the pile came tumbling when the much-opposed 5 per cent tax on passenger cars was reduced to 3 per cent.

Now the 3 per cent on passenger cars is gone and the industry for the first time in 10 years is free of all excise taxation.

Among those who were in the thick of the battle until the smoke lifted, and who deserve the lasting thanks of the industry and the public for the part they have played in the campaign to have motor vehicles ranked where they belong in taxation matters, may be mentioned, among others, Mr. Reeves, the veteran of the corps; George M. Graham, of the N. A. C. C. taxation committee; Pyke Johnson, Washington representative of the N. A. C. C.; Roy D. Chapin, president of the N. A. C. C.; H. H. Rice, of General Motors; C. A. Vane, general manager of the National Automobile Dealers Association, and Thomas P. Henry, president of the American Automobile Association.

They led a good fight—and won.

It is estimated that the tax in its various forms has returned a total revenue to the Government since 1917 of about \$1,099,071,000.

In addition to the tax reduction bill, four other pieces of legislation of interest to the automotive industry and involving \$173,200,000 were passed by the Seventieth Congress. These were the \$165,000,000 Federal-aid bill; the \$4,200,000 appropriation for the Mt. Vernon Memorial Highway; the \$4,000,000 flood relief measure for reconstruction of Federal highways in the states of Vermont, Kentucky and New Hampshire, and the Oddie amendment to the Federal Highway Act.

The Oddie amendment marks the first step that the Federal Government has taken in beautification of the Federal highway system. It authorizes the planting of trees along Federal-aid routes, and provides that the Federal Government shall share with the states on an equal basis the original cost of tree planting and maintenance.

Resolutions Adopted

In addition to the bills passed, three joint resolutions were adopted, the first authorizing a \$15,000 appropriation to send American delegates to the Second Pan-American Congress on Highways at Rio de Janeiro; the second authorizing \$25,000 expenditure for the Federal Government to entertain delegates to the Permanent International Association of Road Congresses, which will hold its sixth session in the United States in 1930, and the third authorizes the appointment of a commission to study the construction of a North-American Highway traversing North, South and Central Americas.

Four measures which are now pending before various committees, and which will be considered further at the December session, include the Browne-Watson bill, which authorizes a special highway building fund of \$407,341,000 and which, it is estimated, will speed up five times highway construction in the United States. The second is the du Pont-Rathbone bill, which provides for the construction of a 500-ft. highway across the United States, to be financed by the leasing of business sites throughout its 3000-mile length. Federal regulation of interstate motor bus traffic failed to reach a vote, but will be taken up early in December, according to Congressman James S. Parker, author of the bill. The fourth measure, which did not reach a final vote, was a \$1,000,000 appropriation for the widening of the National Defense Highway, linking Washington with the Naval Academy at Annapolis.

New *Racing* Fuels *Developed* Abroad Prove Highly Efficient

Raise the specific output of high-compression engines due to latent heat of evaporation. "Motalin," made in Germany, is synthetic product containing iron carbonyl.

IN a recent article on Motor Fuels, Wa. Ostwald, the noted German motor fuel chemist, calls attention to a new class of motor fuels specially developed for racing and which permit of a material increase in the power output of an engine of given displacement.

The ability of these fuels to raise the specific output of engines is due to their high latent heat of evaporation, which might be considered a detriment at first glance. In Germany such fuels are being marketed under the name of Racing Motalin (Motalin being a doped fuel containing iron carbonyl), and in England under the name of Discols, the product of the Distillers Co.

It has been repeatedly observed that greater outputs can be obtained from engines with alcohol and alcohol

nents of these special fuels are known for their anti-detonating qualities. The components also are known for their high degree of volatility, methyl alcohol with its boiling point of 152 deg. Fahr. standing out in this respect. The specific gravities and boiling points of some of the components of these special fuels are given in Table I.

A casual glance at this table reveals the fact that the ease of starting with the different fuels is not a direct function of the boiling temperature. With alcohol it is impossible to start from cold at low temperatures, and this fuel is strongly inclined to settle in the inlet passages from the mixture unless the air is thoroughly pre-heated, although its boiling point is only 174 deg. and considerably lower than that of even the best gasolines. The same applies to a lesser extent to wood alcohol, which has a still lower boiling point. The reason for this is to be found in the different latent heats of evaporation. Every motor fuel absorbs heat in evaporating, as plainly evidenced by the lowering in the temperature of the intake passage. If the heat and the time available are insufficient the fuel will vaporize only partly; there is then a tendency to flood the inlet passages, and evaporation must be completed by the heat of compression during the compression stroke.

This heat of evaporation, or rather, the heat necessary to effect evaporation, is nearly the same for benzol and gasoline, as shown in Table II, and in the case of these fuels, it is quite small, amounting to less than 1 per cent of the heat of combustion. In the case of alcohol it amounts to more than 4 per cent and in that of methanol even 5 per cent. When it is considered that only about 25 per cent of the heat of combustion is converted into mechanical energy, the importance of these figures will be realized.

Ricardo's Calculations

Ricardo has calculated the temperature drop of the mixture as compared with the air entering into it, that would result if all of the fuel evaporated. In the case of gasoline and benzol this amounts to about 36 deg. (see Table II). Actual observations show a temperature drop in the inlet passage from about 68 to 41 deg. Fahr., that is, only about 27 deg., and we may draw the conclusion that even gasoline and benzol vaporize only to the extent of about 75 per cent, one-quarter of the fuel entering the engine in the unvaporized state. The engine, therefore, must furnish for each pound of gasoline consumed, $137/4 = 34$ B.T.U., and in the case of engines with a low compression ratio and correspondingly low heat of compression this involves no special difficulty.

In the case of alcohol, however, the theoretical temperature drop is no less than 176 deg. Fahr. and in the case of methanol even 252 deg. Therefore, if we at-

Table I—Volatilities of Some Motor Fuel Components

| | Specific Grav. | Boiling Point |
|-------------------------------|----------------|---------------|
| Motor benzol | 0.875 | 212 deg. F. |
| Proprietary gasoline | 0.735 | 239 deg. F. |
| Methanol (wood alcohol) | 0.789 | 152 deg. F. |
| Ethyl alcohol | 0.800 | 174 deg. F. |
| Iso-butyl alcohol | 0.803 | 223 deg. F. |

(In the case of the first two of the above liquids the figure for the boiling point refers to the average boiling point.)

mixtures than with gasoline. Ricardo, who conducted investigations on the Discols, noted material gains in power output particularly with high compression motor-cycle engines. The Discols are composed of ethyl alcohol, methyl alcohol, natural gasoline and some acetone and benzol—a number of different grades being sold. Racing Motalin consists of synthetic methyl alcohol, synthetic butyl alcohol, synthetic gasoline and iron carbonyl (a 100 per cent synthetic product).

These special fuels possess no particular advantage when used in stock engines with a normal compression ratio, and their superiority becomes apparent only when the compression ratio exceeds 6 to 1. Even on the dynamometer such an engine will show at least 10 per cent more power in an endurance test, and in racing the advantage shows itself in the fact that the engine does not "tire" even when operated under full throttle for long periods. The engine, moreover, is less sensitive when run on part throttle, and sooting of the spark plugs is said to be completely eliminated when operating on Motalin, even if the engine is over-oiled.

The effect of these fuels is not due to any specially high explosive pressure, for if this were so it would be noticeable in an ordinary engine with 4 or 5 to 1 compression ratio. In fact, practically all of the compo-

tempted to operate an engine with alcohol at 68 deg. Fahr. air temperature, the mixture temperature would have to drop to 184 deg. if all of the fuel were to be evaporated, or, conversely, it would be necessary to pre-heat the air to 320 deg. Fahr., if the mixture were to enter the engine at 68 deg. Fahr.

In practice an appreciable cooling of the mixture takes place, and in spite of this a considerable proportion of the fuel enters the engine in the unvaporized state and has to be vaporized by the heat of compression. However, both of these phenomena are not so pronounced with the racing fuels as with the elementary fuels, as the former are composed only in part of these fuels with high heat of evaporation.

Makes a Denser Mixture

The pronounced cooling of the mixture on its passage to the engine involves an important advantage, as it renders the mixture denser. A lowering in temperature of about 4.6 deg. Fahr. corresponds to an increase in mixture density of 1 per cent. Therefore, if a lowering in temperature equal to that given in Table II for each fuel actually took place, the volumetric efficiency would be greatly increased—39 per cent in the case of alcohol, and even 74 per cent in the case of methanol. If it were possible to operate with methanol alone, in such a manner that all of the fuel were vaporized, then an increase in power output of nearly 75 per cent should be obtained. An increase in power due to this effect is plainly observable, though it is not of the proportions mentioned, which is due to the fact that the lowering

Another advantage claimed for the new racing mixtures is that they burn completely without the formation of soot or carbon deposits. With an alcohol flame, and particularly with one of methanol, it is absolutely impossible to produce soot. There is even less chance of producing soot when these fuels are burned in the motor cylinder, in which not even a benzol mixture produces soot although a benzol flame is exceedingly productive of soot. The result of this is that in racing engines operated on Motalin it is practically impossible to soot the spark plugs when operating on the throttle, even if the engine is over-oiled, although racing spark plugs are exceptionally sensitive to over-oiling. On the contrary, if such fuels are used it is quite permissible to help out cylinder lubrication by adding one-half per cent of cylinder oil or of a castor oil soluble in gasoline (such as Castrol) to the fuel, effecting what is known as "top lubrication."

Owing to their lower heat value the consumption of these special fuels is greater, and specially large carburetor jets must be used. Moreover, in view of the high anti-detonating qualities of the fuels, it is necessary to advance the spark more than ordinarily.

These special racing fuels are rather expensive for the present, and therefore not suitable for ordinary use. Racing Motalin sells in Germany at 1.50 marks per liter (\$1.35 per gallon). A precaution to be observed in handling these new fuels is not to inhale too large quantities of the fumes, which have a light intoxicating effect and may produce very unpleasant results.

Table II

| Fuel | Lower Heat- ing Value | Latent Heat | Lat. Heat Heat Value | Mixt. Temp. Drop due to Evaporation | Result'g Temp. of Mixture with 86 deg. air | Resulting Vol. Efficiency (Gasoline—100) |
|--------------------------|--------------------------|-------------|-------------------------|---|--|--|
| Gasoline | 18,720 | 137 | 0.73 | 34 | +52 deg. | 100 |
| Benzol | 17,280 | 162 | 0.94 | 38 | +48 deg. | 101 |
| Alcohol (95% vol.) .. | 10,800 | 443 | 4.09 | 176 | —90 deg. | 139 |
| Methyl alcohol. | 9,600 | 500 | 5.16 | 252 | —184 deg. | 174 |

in temperature itself slows down the evaporation. The lower the temperature the slower the rate of evaporation, and eventually a point is reached where evaporation ceases entirely, merely because the necessary heat is not available.

It is therefore necessary to complete the evaporation by supplying heat from outside sources, either by pre-heating the air or by supplying the inlet passages with an exhaust jacket. This additional heat, however, expands the charge, for which reason in racing engines the charge must be introduced into the cylinders at the lowest possible temperature which permits of the necessary degree of uniformity of distribution. Whatever fuel gets into the cylinders in the unvaporized state must be vaporized by the heat of compression, which in the high compression racing engines is quite large in amount. In fact, vaporization within the cylinder has an important incidental advantage, as it enables the engine to get rid of excessive heat of compression and therefore obviates detonation. This internal cooling permits of the use of very high compression without trouble from detonation, overheating and faulty lubrication.

Mergers Past and Present

(Continued from page 869)

In 1922 the National Motor Car & Vehicle Corp., the Jackson Automobile Co. and the Dixie Motor Car Co. were merged as the Associated Motor Corp., the name of which was promptly changed to National Motors Corp. This organization went into receivers' hands in 1923, having made practically no progress subsequent to the merger. Hares Motors, Inc., comprised a merger of Locomobile, Mercer and Kelly Motor Truck Co. Financial difficulties were encountered in 1921. Locomobile broke away and was bought by Durant in 1922. Mercer remained with Hares Motors, Inc., until 1922.

These are only a few of the combinations which have been consummated in the industry's past, but serve to illustrate that mergers are no new phenomena to the automotive business.

To speculate definitely about the future of the automotive situation would be to court permanent disaster as a prophet. It does seem reasonably sure, however, that further passenger car combinations will take place, probably before the year 1928 has ended. It seems equally sure, on the other hand, that there is plenty of room for permanent success on the part of many companies now doing business should they desire and decide to continue as permanently individual operators. There are no signs to indicate the gobbling up of the industry by a few hands nor the introduction of any harsher competitive methods than have existed in the past.

It seems certain, too, that there will not be one-tenth as many mergers as are being predicted on Wall Street today; and past records would indicate that a permanent place exists for a large number of independent parts and accessory manufacturers even though more mergers do occur. The raw materials and factory equipment manufacturer, of course, has just as large a market for his products regardless of how the cat jumps.

Industrial Trucks *More* Efficient Under *Central* Control

Westinghouse material-handling innovation effects saving of \$1,000 a month. Group system of wage payment adopted. Handling of materials in foundries discussed.

SEVERAL recent conventions have brought out a number of papers and discussions on various phases of materials handling which are of interest to automotive men. Possibly the most interesting one was given by C. A. Fike, Westinghouse Electric & Mfg. Co., at the spring meeting of the A.S.M.E., in which he told how his company had applied wage incentives to their materials handling force, which, incidentally, has been organized into a separate department under the control of Mr. Fike.

Important economies have been made by placing all the plant transportation facilities under one control, the outstanding one being that the planning and production departments have to contact with but one department in order to get any material handling service they desire. Since all the work is consolidated it has been possible to make much more effective use of equipment by combining loads, transferring them from one type of equipment to another when advisable, and by providing such efficient service that hand trucking has been practically eliminated.

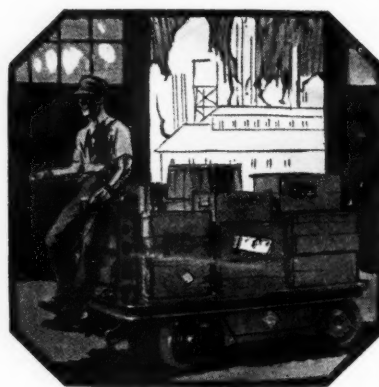
Although the great size and expanse of the Westinghouse plant make necessary the use of many types of equipment for handling materials, such as both standard and narrow gage railroads, automobiles and trucks, cranes and elevators, it is in the method of controlling the activities of industrial electric trucks that most interest probably lies.

A fleet of 85 of these trucks is employed to make shipments of partial loads intermittently where the time element is too important to permit the material to wait for the slower transportation services which handle the bulk of the movement.

Plant Divided Into Districts

In order to utilize these trucks to the best advantage, the plant is divided into districts and all trucking service for each district is handled by a dispatcher who has enough trucks under his control to meet all the transportation needs of his district. Close check is kept on truck loading and only enough trucks to handle the work are kept in service, the surplus, if any, being sent to other districts where the momentary load may be high.

Requests for service are telephoned into the dispatcher's office and placed on a dispatch board. From this board the dispatcher makes up his loads and routings, combining loads whenever possible. The dispatchers report on schedule to the central transportation office as



Elwell-Parker Elec. Co. Illustration

to number of orders they have ahead and from these reports orders are issued from the central office for the shifting of trucks from one district to another to care for peak loads. Return loads are arranged for if possible.

Although the speed of the trucks was limited it was believed that an incentive wage payment would encourage the driver to use greater effort and ingenuity to meet different situations. Practically no information was available about incentive wage plans for this type of work,, but a system has been developed which has proved successful.

Time studies were taken on the work from each manufacturing division served by a dispatch district which showed the running time, the loading time, unloading time and delays of each type of truck used in the work. From these data a time value for the average load from each section was obtained.

Time Value Established

From data secured from the time studies and from past records, the number of loads per day from each manufacturing section was determined and this figure multiplied by the average time per load. The total divided by the total number of loads gave a time value which could be used as a base time for each load or call on the dispatch board.

As a check on the number of loads hauled, a small slip or truck service requisition was adopted. This slip is filled out by the foreman of the section requesting the service and gives all necessary information for the work. The slip is turned over to the trucker and at the end of his trip he turns it over to the dispatcher. They are then checked against the call tickets taken from the dispatch board and furnish the figures from which the payroll department works.

The wage plan is under the group system in which all the truckers working from a single dispatch station are combined into a single wage group. Not only was this type thought to be desirable because of the many things beyond his control which may happen to an individual trucker, and which are more or less evened out by the group plan, but also because under this system the truckers help one another in every way, which might not be the case if each was working for himself only.

Concrete results of the installation of the dispatch and incentive wage payment systems are indicated in the change in equipment needed to handle the work.

Before their installation 88 industrial trucks were in service, about six of them in stand-by service. At present 67 are used to do the same work, probably faster and more accurately than it was done before.

This shows a saving of 15 trucks in active service. The operating cost of a truck is about \$130 a month. Subtracting from this saving of \$1,950 a month the cost of operating the dispatch station, or \$950 a month, there is a measurable saving of \$1,000 per month, well worth considering by any organization.

At the recent convention of the American Foundrymen's Association, J. J. Hartley, Link-Belt Co., offered some interesting comments on methods for determining the returns from material handling equipment. He presented a formula which has been worked out to show, roughly, the amount it is advisable to spend for new equipment for each \$1 per day of earnings to be had from it, depending upon the rate of return expected from the new equipment. This formula follows:

For an earning or saving of \$1 per day you can afford to spend—\$250 if you want 100% return on your money repayment in one year; \$428 if you want 50% return on your money or repayment in two years; \$562 if you want 33 1/3% return on your money or repayment in three years; \$666 if you want 25% return on your money or repayment in four years; \$750 if you want 20% return on your money or repayment in five years.

How the Plan Works

For example, suppose a certain material handling job now requires the service of three men each getting \$6 per day and that by some rearrangement and the installment of a conveyor costing \$4,000 this work could be handled by one man, thereby saving the wages of two men or \$12 per day. This sum, minus the operating cost of the proposed machine, say \$2 per day, gives a net earning of \$10 per day for the new equipment. From the table it is found that a \$10 a day saving will pay out a \$4,280 investment in two years, or better than a 50 per cent return on the investment.

This would appeal to most managements if they were assured that the proposed changes would work out as expected.

At the same meeting, Harold J. Dorus and C. S. Schroeder, The Yale & Towne Mfg. Co., contributed some more information about electric industrial trucks. They pointed out the logic in expecting equipment of the nature of materials handling devices to pay for itself within a short period of time, although other basic improvements made in a plant such as concrete roadways, railroad tracks, etc., are not installed on that basis.

Three years is the average time which most buyers of electric trucks expect the trucks to pay for themselves, although when the products of the user are unstable both in character and in volume, which make obsolescence of the equipment a greater hazard, a basis of one year for return of the cost is frequently employed.

As a bit of basic information in determining the relation between costs for old and new equipment, the authors brought out the fact that analysis of truck operations in a great many plants has indicated that 50 cents an hour or \$4 per day is the average cost of maintenance for a single truck.

The service which may be expected of a truck varies, of course, with the job in hand. In general, an electric industrial truck, either of the elevating or straight load carrying type, equipped with proper bodies, can handle from 100 to 150 tons of loose material over an 8-hour period, while carrying the material an average

distance of 300 ft.

W. B. Marshall of the Chain Belt Co. in another paper presented at the foundrymen's convention, listed the following ways in which material handling equipment can reduce the cost per unit of output:

1. Saving floor space, thus reducing fixed charges for buildings.
2. Increasing volume of output, thus dividing the fixed charges into more units.
3. Insuring established output by setting a pace for the work done.
4. Reducing indirect labor charges by cutting down handling between operations.
5. Reducing direct labor.
6. Reducing labor turnover by improving operating and safety conditions.
7. Improving the quality of the product.

Rules Governing Use

Continuing, Mr. Marshall said that to get the most economical application of material handling equipment requires certain fundamental conditions such as segregation into sizes of the material to be handled; location of operating equipment in direct lines so far as possible; required capacity equal at least to the minimum capacity of standard material handling equipment; utilization of present equipment to the fullest degree.

In the application of material handling equipment to sand conditioning in a large steel foundry, Mr. Marshall cited a case where direct labor savings of \$10,000 had been made. Sand handling labor had been reduced from 120 hours to 59 per working day, which represents a saving of \$2 per ton of castings produced.

In a fourth paper on this same subject presented to the foundrymen, E. F. Scott of The Austin Co. gave some pointers on the relationship of material handling equipment to building layout. There is a very close relationship between these two, he said, and if both the building and the equipment are to function properly this relationship must be considered when the building is designed and it must be, in effect, built around the material handling equipment rather than having the latter stuck in as best it may be after the building has been completed.

Arc Welding Improvement

GENERAL ELECTRIC CO., Schenectady, announces an improvement in the control equipment used with its automatic arc welding heads by means of which the feed of electrode wire is stopped a short time before shutting off the arc welding current at the end of the weld. This clears the electrode from the weld and fills the crater which is left at the end of the weld when the arc is cut off short.

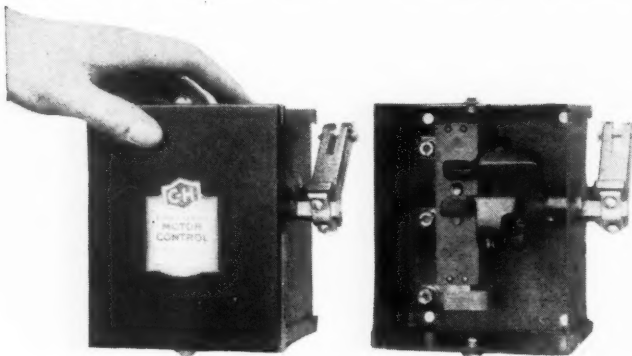
When the end of the weld is reached the operator pushes the "Stop" button which opens an auxiliary contactor. This stops the electrode motor and opens the magnetic clutch circuit, thus stopping the feed. The line contactor remains closed for a short time because of the action of a time-delay relay which allows the arc to burn back the electrode enough to clear the weld and also to fill the crater.

THE Bureau of Commerce, Division of Simplified Practice, has issued Recommendation No. 67 concerning Roller Bearings. It lists sizes with bores of from 5/8 in. to 4 1/2 in. The list contains the bore, outside diameter, width, corner radii, bearing numbers and—in cases where this applies—the metric equivalent.

NEW DEVELOPMENTS—Automotive

Lever-Operated Master Switch

A NEW switch, designed especially for splined shaft or shipper rod operation is announced by the Cutler-Hammer Mfg. Co. of Milwaukee, Wis. This switch is for use as a pilot circuit control device on lathes and other equipment where starting and stopping of the machine is to be governed by a splined shaft, shipper rod or similar device. Low voltage protection



Cutler-Hammer lever-operated switch

is one of the important features. Should the motor stop it will not restart until the switch has been operated again.

Some of the other outstanding features are non-stubbing contacts; shear pin to protect mechanism; few parts and simple construction; operating lever can be placed in any one of four operating positions, 90 deg. apart, to suit any installation requirement; long, steel-to-bronze main bearing with oil hole; small size; fully inclosed in heavy steel case; and cover can be removed by loosening only two screws. The switch is designed especially for three-wire control, but can also be used for two-wire control on pilot circuits up to 550 volts.

Farrel Sykes Gear Generator

THE Farrel-Birmingham Co., Inc., has just brought out a new size Sykes gear generator which is known as the No. 4-A. In general this new machine is similar in design and construction to the No. 2-A which was fully described in *Automotive Industries* for March 3, 1928.

The new machine is intended for heavier work than the 2-A so that certain changes have been necessary. The bed is similar but the work saddle ways are extended forward so that they are always beyond the point where the cutters are operating on the blank. The back of the work saddle has been raised and the bracket supporting the work mandrel is seated on V ways which are raised and are radial to the gear center.

The bracket supporting the outer end of the mandrel is bored to a

semi-circular form so that pinions with large extended shafts up to 9 in. diameter can be fitted in bushings and held. Two locking screws are used for the cutters. An adjustable pair of rim supports is provided for the wheel blank.

The No. 4-A machine will cut double helical gears of either continuous or staggered tooth design from 1 to 49 in. diameter, from 1 to 18 in. face width and from 10 DP to 1½ DP. It will generate straight tooth or single helical gears up to 10 in. face width within the above limits of diameter and pitch. It will cut cluster gears simultaneously.

Staynew Air Filter

A NEW air filter for removing dust, water, oil, rust, scale and other foreign matter from air being carried through pipes to air tools, paint sprays, chemical processes and similar installations has been developed by the Staynew Filter Corp., Rochester. The filter consists of an aluminum housing inclosed in a pressed steel housing. The filter medium is of felt formed in pockets over radial wire screen fins grouped around a central outlet.

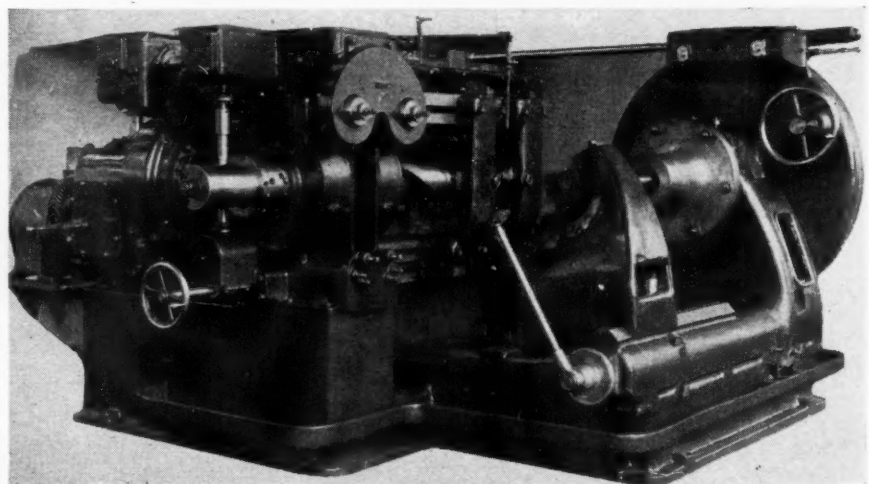
As air enters the filters it is thrown against the wall of the steel housing by a shield over the top of the filter and most of the foreign matter is carried to the bottom of the shell by the downward velocity given by this action. Remaining foreign matter is caught by the filter. Cleaning of the filter is a simple process and is said to be necessary but twice a year.

Another air filter of the same general type has also been developed by the Staynew Filter Corp. for filtering large volumes of air for building ventilation.

P. & W. Rotary Chuck

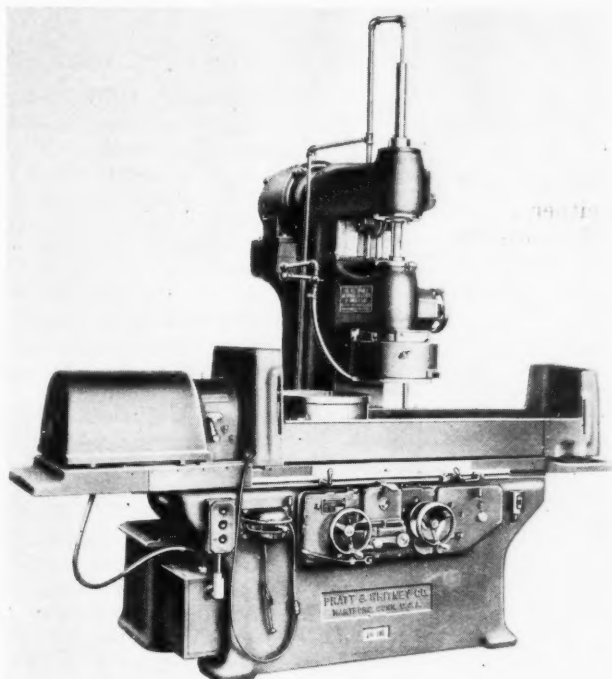
A SEPARATELY driven rotary chuck to be mounted on the left end of the table of the Pratt & Whitney 14-in. vertical surface grinder, Model B, has been developed by Pratt & Whitney Co., Hartford, Conn. Either a plain or magnetic chuck can be used.

The chuck is mounted on the regular table and bolted



No. 4-A Sykes gear generator

Parts, Accessories and Production Tools



Pratt & Whitney 14-in. vertical surface grinder equipped with the new rotary chuck

into position. It is driven by a separate 2 hp. motor through a two-speed gearbox, spiral bevel gears and a worm and wheel. The gearbox is operated by a lever in front of the housing and push button control, including a jog button, is provided for the motor.

The regular machine controls are used to move the table under the wheel. With the table in the extreme left position the chuck is accessible for loading. The regular power traverse then moves the chuck under the wheel to the desired position for grinding.

Either the plain or the rotary chuck—the latter being water and oil-proof and having a new type of collector ring—can be used and both have set screws which permit tilting. Lubrication is supplied to all moving parts except the motor from three reservoirs.

The diameter of the new chuck is 16 in. and it may be tilted $1\frac{1}{2}$ deg. above or 5 deg. below zero. The two chuck speeds are 108 and 154 r.p.m. The distance from the chuck surface to a new wheel is $7\frac{1}{4}$ in. for the plain chuck and 4 in. for the magnetic chuck.

Covert Truck Transmission

THE Covert Gear & Mfg. Corp., Lockport, N. Y., has developed a new transmission for $1\frac{1}{2}$ to 2-ton trucks. It is of the unit type, has four speeds and is adaptable to either a No. 3 or No. 4 standard S.A.E. bellhousing. It is designed to take a maximum torque of 180 ft.-lb.

All shafts and gears are made of nickel steel, hardened and heat-treated. The main shaft is mounted on ball bearings carrying a solid roller bearing at the pilot end. The countershaft carries the low speed gear integral with the shaft, having the other end machined with 10 splines for the purpose of carrying the con-

stant mesh second and third speed countershaft gears.

The standard transmission is furnished with a five-plate, serrated tooth multiple disk clutch, but single plate clutches can be accommodated if desired. The countershaft is mounted on ball bearings but can be arranged for Timken roller bearings. The unit is furnished with direct drive in fourth speed with a low speed of 5.85 to 1. Where more speed is required direct drive in third and over drive 0.85 to 1 in fourth can be supplied.

The case is designed with openings of standard S.A.E. dimensions for various power take-offs.

"Dry Ice" Delivery Truck

FITZ GIBBON & CRISP, INC., Trenton, N. J., has recently developed a new type of delivery body for ice cream delivery. It is designed to use "dry ice" or compressed CO_2 gas as a refrigerant, since 20 lb. of dry ice will do the work of 500 lb. of salt and ice commonly employed.

The body is constructed of a combination of cork and balsa wood and special waterproof Vehisote panel material with Toncon iron containers inside. The patented circulating system which keeps a flow of the cold gas about the containers makes possible temperatures as low as minus 20 deg. Fahr.

This body is being built in three sizes: 300-gal. ice



The small piece of dry ice being placed in the new Fitz Gibbon & Crisp ice cream delivery body replaces 300 lb. of salt and ice

cream capacity for Ford and other light chassis; 400-gal. capacity for 2-ton chassis and 500-gal. capacity for $2\frac{1}{2}$ -ton chassis.

Shankless Tool Holder

THE O. K. Tool Co., Inc., Shelton, Conn., has developed a shankless tool holder and tool bit for use on very heavy turning work. The tool bit is retained in the holder by a double taper which is self-locking in the direction of the feed but which is also provided with the usual rear lock arrangement. The tool may be adjusted sidewise for wear in the direction of the feed. The tool has no shank, which simplifies manufacture. The holder has no hole in it.

AUTOMOTIVE **NEWS SECTION** INDUSTRIES

Philadelphia, Pennsylvania June 9, 1928

Heavy Retail Sale Holds Factory Operations High

PHILADELPHIA, June 9—Following May production in automobile factories close to the high totals of the two previous months, the indications are for no more than the usual seasonal decline in June. In many of the smaller producing companies the May total has shown important gains over April and also over May of last year, the declines, for the most part, being among the large producing companies.

Beginning with June it is likely that the industry as a whole will show important gains over the 1927 totals. Increasing output of Ford Motor Co. will be mainly responsible for this, as the decline and finally complete cessation of Ford operations in 1927, reduced the figures of that year below the 1926 totals.

A general quickening of the retail market has followed the elimination of car excise taxes, and the interest in automobiles has been further stirred by the announcement of the Chrysler-Dodge Brothers merger. Retail sales of new cars are expected to continue strong through the month.

N.A.C.C. to Promote U.S. and Export Sales

NEW YORK, June 7—The National Automobile Chamber of Commerce today named a trade promotion committee headed by A. P. Sloan, Jr., president of General Motors Corp., which will devise ways and means to promote the sale and use of automobiles here and abroad. Alvan Macauley was elected president of the chamber succeeding Roy D. Chapin.

Other officers elected were A. H. Swayne, vice-president; A. R. Erskine, vice-president of the passenger car division; A. J. Brosseau, vice-president commercial car division; H. H. Rice, treasurer; and John N. Willys, secretary. Directors elected were W. P. Chrysler, R. C. Graham, C. D. Hastings, F. J. Haynes, C. W. Nash, W. E. Metzger, R. E. Olds, Walter P. White, and R. D. Chapin. A resolution was adopted thanking Mr. Chapin for his services as president.

Serving on the trade promotion committee with Mr. Sloan are Mr. Macauley, Mr. Nash, Mr. Willys, Edsel Ford, Mr. Chapin, Mr. Erskine and Mr. Chrysler.

M.&A.M.A. to Publish Directory

NEW YORK, June 6—The Motor & Accessory Manufacturers Association is preparing for issue on July 1 a sales and credit directory of automotive wholesalers which will be brought up to date and then issued quarterly.

Production in May Estimated 443,700

NEW YORK, June 7—Automobile production during the month of May by members of the National Automobile Chamber of Commerce is estimated at 388,700 vehicles which makes the largest May for N.A.C.C. members. This figure compares with 339,923 for May of 1927 and with 397,954 in April of this year.

Ford production for the month of May is estimated at 55,000, bringing the estimated production for the entire industry for the month up to 443,700 units.

Elimination of motor taxes to the buyers of automobiles is resulting in more sales, according to reports filed at the directors' meeting today of the National Automobile Chamber of Commerce.

President Roy D. Chapin said: "There is every indication from the retail reports that June will have a record business in automobile sales."

Butcher Joins Budd

DETROIT, June 7—Harold E. Butcher has resigned as vice-president in charge of equipment sales of Champion Spark Plug Co., to become second vice-president in charge of sales of the E. G. Budd Mfg. Co. Mr. Butcher will have headquarters in Detroit and will be in charge of both wheel and body sales.

Balloon Tire Suit Started

DETROIT, June 7—The suit of the Steel Wheel Corp., controlled by Motor Wheel Corp., and against the B. F. Goodrich Rubber Co., to establish rights under the Putnam balloon tire patent, was started this week in Federal District Court here.

Baits Succeeds Fekete

DETROIT, June 7—Stewart G. Baits has been appointed chief engineer of Hudson Motor Car Co. to succeed S. I. Fekete, resigned. Mr. Baits previously was assistant to Mr. Fekete.

Turkish Government to Buy 400 Trucks

WASHINGTON, June 7—The Turkish Government will buy 400 trucks, probably during July, it is recalled by the Department of Commerce in a statement made public recently, calling attention to Special Circular 1067 of the Automotive Division of the Bureau of Foreign and Domestic Commerce. Cable advice from Constantinople indicates that the government will seek the 1½-ton type of trucks for army use and interested American manufacturers are requested to submit bids to the Turkish ministry of National Defense, either direct or through the Constantinople office of the Bureau of Foreign and Domestic Commerce.

Pittsburgh Plate Glass Buys Ditzler Color Co.

DETROIT, June 5—Ditzler Color Co. has been purchased by the Pittsburgh Plate Glass Co., according to Edwin R. Hoag, president of the Ditzler company. The amount involved was not made public. Purchase of the Ditzler company gives Pittsburgh Plate Glass two large plants manufacturing lacquer, the other being in Milwaukee. The new owners contemplate expanding the Ditzler plant, Mr. Hoag stated.

The Ditzler company will retain its same name and will be operated as an independent subsidiary of the Pittsburgh Plate Glass Co. The Ditzler plant consists of seven units, manufacturing lacquer and other automobile finishing material. The Ditzler company, several months ago, moved into its modern new factory at 8000 Chicago Boulevard, West. Mr. Hoag continues as president of the Ditzler organization and other officers will also be retained.

Rickenbacker Sale June 21

DETROIT, June 4—The real estate and buildings of the Rickenbacker Motor Co. will be sold at public auction on June 21 by order of the U. S. District Court. The property includes plants at 4815 Cabot Ave., and at Twelfth St. and Grand Trunk Railroad.

Shattuck Leaves Dodge

DETROIT, June 6—E. W. Shattuck has resigned as director of territorial development of Dodge Brothers, Inc. His successor has not been appointed.

Sloan Says Industry Must Supply Novelty

Maintenance of Present Prosperity Demands Constant Offering of New Features

DETROIT, June 6—Addressing the Bankers Club of Detroit Tuesday night, Alfred P. Sloan, Jr., president of General Motors Corp., declared that the automotive industry having become the greatest industry, takes the responsibility of being the greatest single influence as effecting national prosperity.

Of the future prosperity of the automotive industry, Mr. Sloan said: Whether we, as manufacturers, are going to be able to maintain our present production, let alone increase it, depends upon whether we, as manufacturers, are going to be able to offer to the public year after year cars sufficiently more attractive in appearance, or sufficiently more capable in performance, or sufficiently interesting in any other way, as to provide the necessary incentive to those purchasers who can afford to turn in a car relatively new, with its transportation value far from consumed, and paying depreciation simply for the privilege and luxury of driving in the latest and most attractive models. I feel sure that if we are not able to continue that process that we will find a very important reduction in the number of cars that we can sell yearly.

"It seems at present, with the beautiful cars we have and their high performance value, that it will be almost impossible to have anything very much better, yet as I go through our research laboratories and see the new devices that we are working on and measure the possibilities of the future; as I go through our engineering departments and see what is being accomplished; as I contact with our manufacturing departments and see what is being done in the way of reducing costs, I begin to realize that, after all, we have not gone so very far in our progress of development as one might think and perhaps we are even nearer the beginning than we are to the end.

Sees Continuing Improvement

"I feel sure as long as we continue to search for something that is better, with the same intensity of effort that we have done in the past 20 years and as we understand better the relation of one thing to another, there is no question but what we shall be able to take an equal or probably a less amount of material and refashion it into a product which, as the years go by, will be more attractive from the standpoint of appearance, have greater convenience and will have advantages that will more than justify the exchange of the present car into the new car and the continuation of the cycle of operations

which seems to me to mean much to us in maintaining our present scale of operations."

Of exports Mr. Sloan predicted increases for many years to come. "Excluding Canada corporations exports this year will exceed \$200,000,000," he said. He also reiterated previous statements on the corporation's relations with its dealer organization and explained other workings of General Motors Corp.

Michigan Smelting Sale to Bohn Voted by Board

DETROIT, June 7—Proposals for the purchase of Michigan Smelting & Refining Co. by the Bohn Aluminum & Brass Co. have been approved by the directors of both companies. Stockholder action will be taken in the next 30 days. The purchase would be through an exchange of stock and the Bohn company capitalization would be \$2,155,700 preferred stock and 350,000 shares of no par common. The combined assets total \$10,232,000.

Vought Plane Shipments Near \$250,000 Monthly

NEW YORK, June 2—Chance Vought Corp. reports shipments of airplanes and parts totaling over \$240,000 during May. Monthly shipments from the Vought plant have been steadily mounting and within the next 60 days will amount to over \$300,000 per month. The company has orders ahead for one year at this production rate.

The factory facilities have been more than doubled, and a total floor space of 112,000 sq. ft. is now utilized. A two-track assembly line has been installed.

Take Over Union Battery

PITTSBURGH, June 7—Formation of a new company to take over the Westinghouse Union Battery Co. is under way. The new company will be headed by J. L. Rupp, who has been in executive charge of the business. A leading factory in the storage battery field will have the principal interest. Operations will be continued in the Pittsburgh district.

Studebaker of Canada to Expand

SOUTH BEND, June 6—Studebaker Corp. of Canada, Ltd., is reorganizing its administration and manufacturing policies to conform with a plan to use more Canadian raw material and labor and increase exports from that country. D. R. Grossman, formerly sales manager of the Canadian operation, has been named vice-president and general manager.

Fageol Builds 100 a Month

OAKLAND, CAL., June 5—Fageol Motors Co. is now delivering 100 trucks a month, as compared with a total annual output of 200 vehicles three years ago, according to an official statement.

Business in Brief

Written exclusively for **AUTOMOTIVE INDUSTRIES** by the **Guaranty Trust Co.**

NEW YORK, June 7—The outstanding financial development of the past week was the advance in money rates on June 4, call loans reaching 7 per cent, the highest figure in seven years. The upward movement of rates was accompanied by an abrupt reaction in stock prices, which had advanced irregularly during the preceding week. The rediscount rate of the Federal Reserve Bank of San Francisco was raised from 4 to 4½ per cent last week, making the higher rate uniform throughout the system with the exception of the Federal Reserve Bank of Kansas City, which still retains the 4 per cent rate.

FEDERAL RESERVE REPORT

In the week ended May 30, loans and discounts of Federal Reserve member banks in leading cities increased \$42,000,000, notwithstanding a decline of \$19,000,000 in "all other" (mainly commercial) loans. Discounts of the Federal Reserve banks advanced again to \$944,000,000, which compares with \$847,000,000 a week earlier and \$385,000,000 at the end of January.

GENERAL TRADE

With more favorable crop prospects, trade increased in volume last week, particularly in agricultural districts. The general situation, however, is essentially unchanged, most indexes continuing to reflect lower levels of activity than a year ago.

FREIGHT CAR LOADINGS

Railway freight loadings rose to a new high mark for the year during the week ended May 19, numbering 1,003,497 cars. This is, however, considerably below the total of 1,027,498 cars loaded in the corresponding period last year and that of 1,039,070 cars two years ago.

BANK DEBITS

Bank debits to individual accounts outside of New York City, regarded as an indication of the volume of commercial check payments, were 4 per cent smaller during the week ended May 30 than in the corresponding period last year.

FISHER'S INDEX

Commodity prices continue to decline slowly. Professor Fisher's index stands at 98, as against 98.8 a week ago and 99.8 early in May. Dun's index reflects a decline of 1½ per cent during the past month.

PETROLEUM OUTPUT

Crude petroleum output increased slightly during the week ended May 26, averaging 2,350,750 bbl. daily, as compared with 2,339,000 bbl. a week earlier and 2,498,300 bbl. a year ago. Prices of crude oil and gasoline were practically unchanged last week.

Many Plants Show Higher May Totals

General Production for Month
Compares Favorably With
April and May, 1927

DETROIT, June 2—Production figures released by various motor car builders indicate that May output was substantially ahead of the corresponding month of last year. While few of the manufacturers have revealed their production plans for June, indications are that it will follow seasonal trends and that it also will compare most favorably with the output rate of a year ago.

Chevrolet Motor Co. set a new production record in May when output totaled 140,700 cars and trucks, according to W. S. Knudsen, president and general manager. This compares with 115,600 in May, 1927, which was the highest production month prior to this year.

A total of 651,000 of the new Chevrolet models have been built to-date compared with 513,000 units for the corresponding period of last year.

Graham-Paige Motors Corp. continues to set new production and shipping marks. During May, 8511 Graham-Paige cars were built and 8560 shipped as compared with 8275 built and 8357 shipped in April. The May production brings the total for the first five months of 1928 to 29,916 as compared with 10,665 in the first five months of 1927.

Hupp Motor Car Corp. established a new all-time record in May with shipments of 8361 cars compared with 8092 in April, and 3516 in May of last year. Shipments for the first five months total 33,312 cars compared with 19,431 cars in the corresponding period last year, an increase of 13,882 cars or 71 per cent. Hupp entered June with 2180 orders carried over.

Dodge Brothers, Inc., shipped 19,717 passenger and commercial car units in May. For the five month period ended May 31, shipments aggregated 102,560 units compared with 83,781 in the corresponding period of 1927, or a gain of 22.4 per cent.

Hudson Total for May 32,450

Hudson Motor Car Co., produced and shipped 32,450 Hudson and Essex cars, a gain of 12 per cent over April. June is expected to show well over 30,000 cars. Company reports that much buying has been delayed on account of cool weather. Total shipments of Hudson and Essex cars for the first five months of 1928 total 151,886 compared with 145,252 in the corresponding period of last year.

A total of 4782 units were produced by Packard Motor Car Co. in May compared with 2101 in the same month last year, an increase of 2681 cars. During the first nine months of its current fiscal year Packard shipped 33,930 cars, compared with 24,265 a year ago.

Motorcycle Exports 45% of Production

WASHINGTON, June 7—Forty-five per cent of the American output of motorcycles was shipped abroad last year, according to the Automotive Division of the Department of Commerce. Exports numbered 19,469 of a total output of 43,000. The United States now ranks as third largest producer of motorcycles, England holding first place and Germany, second. France dropped from third to fourth place during the last year, exchanging places with this country.

A new high record was set by Reo Motor Car Co. in May with shipments totaling 6121 cars and trucks, an increase of 576 over May, 1927. April shipments aggregated 5277 units.

Peerless Motor Car Corp. shipped 1250 units in May compared with 1100 in April. Peerless reports that it entered April with more unfilled orders on the books than in any of the previous five months.

Oakland Motor Car Co. shipments in May totaled 25,674 compared with 25,409 in May, 1927, and 27,061 in April, 1928. Company's shipments for the first five months of the year aggregate 128,305 units compared with 79,286 in the corresponding period of last year, an increase of 49,019 or 62 per cent.

Willys Produces 45,686

Production by Willys-Overland Co. in May totaled 45,686 against 38,020 in April. Shipments in May totaled 44,559 against 27,564 in May last year. Production in the first five months of 1928 totals 156,800, against 126,301 in the first half last year. A new high day record for shipments was established May 31 when 2243 cars left the plant.

Olds Motor Works built 11,716 cars in May against 3485 in May last year and 11,089 in April this year. For the first five months, shipments total 38,728 against 25,947 in the same period last year. The June schedule is for 12,000 cars.

Studebaker Corp. of America built 13,253 cars in May as compared with 11,902 in May, 1927.

Durant Motors, Inc., reports May shipments of 12,534 which compares with 11,012 in April. Export shipments in May increased 300 per cent over shipments in May last year.

Cadillac Motor Car Co. shipped 3752 cars in May, the largest May total in the company's history. Deliveries to owners in May will total between 4500 and 4800 according to L. P. Fisher, president.

Auto-Lite & U.S.L. Deal Now Completed

First Dividend on New Stocks
Totaling \$892,000 to be
Paid in July

TOLEDO, June 4—Corporate proceedings and agreements in connection with the reorganization and merger of the Electric Auto-Lite Co., and the former U.S.L. Battery Corp., were completed Saturday, it was announced by officials of the company.

Directors of the Electric Auto-Lite Co., which now controls through stock ownership the plant and business of the U.S.L. Battery Corp., and its former subsidiaries, at their regular meeting on Saturday declared a dividend of \$1 a share upon the new common shares to be issued upon the basis of 2.6 shares for each present share of Electric Auto-Lite common and 1.5 shares for each present common share of U.S.L. Battery, payable July 2 to holders of new common shares at the close of business June 22.

Directors also declared a dividend of 58 1/3 cents per share for the month of June on the preferred shares of Electric Auto-Lite which are to be issued in exchange for "A" and "B" preferred shares of U.S.L. Battery, payable on or after July 2 to holders of record June 22. Dividends on these preferred shares for April and May are to be paid June 5 by U.S.L. Battery Corp., to holders of record May 31.

President C. O. Miniger reported that the production and profits of the Electric Auto-Lite Co. for May were the greatest in the company's history, largely exceeding any other month, and orders and production schedules for June are substantially greater than for May. Business of the newly acquired battery subsidiaries is also best in their history.

Total dividend payments to be made on July 2 will be more than \$892,000, one of the largest quarterly distributions to be made by any Toledo industry.

Enlarges Fostoria Plant

TOLEDO, June 4—The Electric Auto-Lite Co., is enlarging its plant at Fostoria to take care of increasing production schedules. Night shifts are at work in both Toledo and Adrian plants.

Briggs to Add \$700,000 Unit

DETROIT, June 4—Briggs Mfg. Co. will construct a large unit costing approximately \$700,000 to permit increased production of bodies. The building will be of reinforced concrete, 360 ft. long and 138 ft. wide. Its five floors will be devoted to stamping operations on an augmented scale. It will be situated on a site recently acquired on Warren Avenue, between St. Jean and Connors Avenues. This is the second addition made to the company's facilities within a year.

GM May Exports to Show 60% Rise

Cartel of European Makers Not Discussed at Bureau Meeting, Says Mooney

NEW YORK, June 2—J. D. Mooney, president of General Motors Export Co., who has just returned on the S. S. Majestic from a trip to Europe during which he represented the National Automobile Chamber of Commerce at the Paris conference of the Permanent Bureau of International Automobile Constructors, reports that the European automobile cartel was not discussed at this meeting. He says that the cartel movement automatically collapsed on account of its obvious unsoundness.

The export division of General Motors Corp. will do a business of approximately \$25,000,000 for May, which is an increase of nearly 60 per cent over May, 1927, according to Mr. Mooney. While the American automotive industry will always have its major market at home, its expansion is to come abroad, Mr. Mooney points out.

He told of an English manufacturer who plans to produce a small light closed car, weighing less than 1000 lb. and with an engine one-third the power of American cars in the low-priced field.

Mr. Mooney was accompanied by W. D. Appel, chief engineer of Vauxhall Motors, Ltd., and H. S. Broom, chairman of the Delco-Remy-Hyatt, Ltd., of England.

G.M. to Assemble in Saskatchewan

DETROIT, June 5—General Motors of Canada, Ltd., will erect a \$1,000,000 manufacturing and assembly plant at Regina, Sask. It will be Regina's largest industrial plant, and will be devoted not only to the assembly of Pontiac and Chevrolet automobiles but also to body building, painting and trimming. The plant will have a capacity of 150 automobiles daily, and will employ from 650 to 800 men. Establishment of the Regina plant is in accordance with the General Motors policy of placing assembly units as near as possible to centers of volume business.

France 1927 Output 190,000

WASHINGTON, June 7—The French automobile industry ranks first of all French industries and holds a place in European automobile manufacturing second only to England, Trade Commissioner Kelly at Paris advises the Department of Commerce. In 1927 France produced 190,000 cars valued at \$280,000,000; England produced 231,000 automobiles; Germany, 72,000 and Italy 55,800.

Oshkosh Reorganization Fails

OSHKOSH, WIS., June 2—Judgment of foreclosure and sale has been entered

against the Oshkosh Motor Truck Mfg. Co., in the Winnebago circuit court. The concern was placed in the hands of a receiver about a year ago, and W. G. Maxcy, Oshkosh capitalist, has continued the business as receiver, meanwhile attempting to effect a reorganization. All plans failed, due to the lack of agreement among the unusually large number of stockholders and bondholders and the sale has been ordered.

Aeronautical Industries Names Gardner President

NEW YORK, June 2—Aeronautical Industries, Inc., has been formed for the purpose of providing expert advice and financing of airplane builders and airline operations. Lester D. Gardner, former owner and publisher of Aviation, has been elected president.

He points out that four times as many airplanes will probably be built this year as were built in 1927.

"The soundest principles of modern investing will be followed by the directors," he said. "By spreading the funds of the company over the widest possible range of aviation activities, it is felt that a great stimulus can be given to this new industry at a time when imprudent investment by the inexperienced might produce instability."

Bach Aircraft to Build Plant

SAN FRANCISCO, June 4—Bach Aircraft Co. has purchased land for a factory and public airport in the San Fernando Valley, not far from Los Angeles, and will erect a plant thereon immediately, according to H. J. Heffron, president. Investment, he said, will be approximately \$5,000,000.

Schmidt Sees 50% Gain in Japanese Sales; Central America Needs Parts, Says Lawrence

NEW YORK, June 2—Walton P. Schmidt, field representative of the National Automobile Chamber of Commerce, who has been holding a series of meetings in the principal cities of Japan, reports the organization of the dealers and the adoption of a program for increasing good roads and for securing fair taxation and other benefits to the industry. There was also formed, while Mr. Schmidt was in Japan, a National League of Motoring Organizations with somewhat the same program in mind.

In commenting on the tax situation, Mr. Schmidt reports an increasing sentiment toward gasoline taxes to raise revenues for highway construction purposes.

Mr. Schmidt looks forward to a 50 per cent sales gain this year over 1927.

Instalment buying is making little headway in Japan, due to the fact that finance companies and banks have absolutely no means, under existing law, of protecting their investments. How-

Exports of Aircraft \$815,490 in Quarter

Total Shows Increase of 250% Over 1927 Quarter—Peru is Leading Buyer

WASHINGTON, June 7—Exports of aircraft engines, parts and accessories from this country during the first three months of the current year, valued at \$815,490, were approximately 250 per cent greater than that for the first three months of last year when all such products exported were valued at \$234,337, according to the aeronautics section of the transportation division, Department of Commerce.

Exports of aircraft alone, including both airplanes and seaplanes, showed a 600 per cent increase during this period over the period for the year preceding, \$509,419 worth of aircraft, made up of 49 units, comprising the exports for the first three months of the current year while the same period last year showed exports of five units valued at \$84,576.

Peru was the principal market during the three months under review, 18 units valued at \$120,970 being sent to that country. Canada took 9 aircraft valued at \$89,750; Mexico, 9; Cuba, Brazil, and Japan respectively, 4, 3 and 2 units.

Steel & Tube Buys Site

DETROIT, June 4—Steel & Tube Co., Inc., has selected a site at Ferndale and will erect a \$1,000,000 factory to replace the plant now operating at Toledo.

ever, a movement is under foot to remedy this situation.

John V. Lawrence, field representative of the N.A.C.C., who has been meeting with dealers and government officials in Salvador, reports that the roads there, while meager in many respects, are among the best to be found in Central America.

The government of Salvador is negotiating a loan of \$5,000,000, most of which it is understood will be expended on improvement of roads. There is a marked tendency in Central America, according to Mr. Lawrence, for the governments to spend less money on the development of railroads and more on the development of public highways.

The cost of owning and operating an automobile in Central America is very high, Mr. Lawrence's report shows, and service on replacement parts, particularly, is usually poor, due to dealers being so far away from factories.

Such financing of sales as is done in Salvador is handled by the dealers.

Men of the Industry and What They Are Doing

Durant Back from Europe, Sees Mergers Continuing

William C. Durant, who has returned aboard the S. S. Berengaria from an extended trip to Europe, looks upon the Chrysler-Dodge consolidation as a constructive step in a direction toward which the automotive industry is heading today. The whole industry is trending in this direction, he said, and he looks forward to the time when the industry will be in the hands of three or four large companies.

While abroad Mr. Durant acquired a lease on an office and warehouse building in Paris and a showroom in the Champs Elysee.

Mr. Durant is still bullish on the stock market and believes that the next three or four months will witness a continuation of the recent activity. Present conditions he regards as merely a leveling off and not as an indication of a depression.

Peters Joins Nash Export

A. C. Peters has been appointed export sales promotion manager of Nash Motors Co. Previous to joining the Nash organization, Mr. Peters was associated for 13 years with Packard; three years as traveling foreign representative and the last three years as sales and advertising manager of the export corporation in New York City.

Campbell Sells Auburn

Captain Malcolm Campbell, English driver, who set a world's record for speed by driving his 12-cylinder Bluebird 206.956 m.p.h. at Daytona Beach, Fla., is now affiliated with Auburn, Malcolm Campbell, Ltd., London, having been named distributor for Auburn cars in England.

Dagner Joins Fageol

Ed Dagner, for 15 years representative of two large truck manufacturers in the West, has been appointed factory representative by the Fageol Motors Co., Oakland, Cal. His territory includes northern and central California.

Kingston and Fellows on Board

A. C. Kingston has been appointed assistant general manager in charge of sales of the Boston Woven Hose & Rubber Co. and also elected a member of the board of directors. J. W. Fellows, factory manager, has also been elected to the board of directors.

Ryan Heads India Sales

Announcement has been made of appointment of Frank L. Ryan as vice-president and general sales manager of the India Tire & Rubber Co. Mr. Ryan was formerly Pacific coast manager of the same concern.

Nash Gives Kenosha \$400,000 for Y.M.C.A.

Citizens of Kenosha have over-subscribed by more than \$10,000 the campaign to raise \$800,000 for a new Y.M.C.A. building for which Charles W. Nash, president of Nash Motors Co. donated \$400,000 on condition that a similar amount be raised by popular subscription. The campaign closed with a torchlight parade on the night of May 29, to the home of Mr. Nash.

G.M. Export Makes Assignments

C. V. Austin has joined the general manufacturing division of General Motors Export Co. and will become plant engineer for the regional staff in Europe. He was formerly plant engineer at Peerless Motor Car Corp. C. C. Salino has joined the company as truck sales representative, coming from Mack International Motor Truck Co.

John Pawloski has been appointed production manager of General Motors W. Polsee SP, the assembly plant at Warsaw. L. W. Pilis has been appointed assistant sales manager of General Motors Japan, Ltd. C. R. Osborn, general service manager of General Motors Export Co., has returned to New York after visiting the assembly plants in Argentina, Brazil and Uruguay.

Watling Visits U. S. Plants

H. R. Watling, general manager of the British Cycle and Motorcycle Manufacturers & Traders Union, Ltd., has been in this country obtaining ideas as to American business methods. Mr. Watling was a recent visitor in the office of the N.A.C.C.

Sykes Joins Cincinnati Car

H. R. Sykes has been appointed manager of sales of the locomotive division of the Cincinnati Car Co., manufacturer of Cincinnati types of electric and gas-electric locomotives for industrial haulage.

Johnson Goes With Ross

Ray P. Johnson, formerly of the Hannum Mfg. Co., Milwaukee, has accepted an offer of the Ross Gear & Tool Co., Lafayette, Ind., and will take over his new work July 1.

Sloan Addresses Bankers

Alfred P. Sloan, Jr., president of General Motors Corp., addressed the Bankers' Club of Detroit at the Hotel Statler, June 5.

C. B. Hartner Leaves Ford After 24-Year Association

Charles B. Hartner, general superintendent of the Fordson plant of Ford Motor Co., has left the employ of the company. No announcement has been made as to his successor.

Mr. Hartner went to work for Ford in 1904 when the property was located at Mack Ave. and the Detroit Terminal Railroad, Detroit. His first work was as a mechanic on the building of the Model B engines and he also helped to prepare the "Old 999" which established a world record on the ice of Lake St. Clair.

When Ford built his next plant on Piquette Ave., he became general foreman at the age of 20 years. Later he became superintendent of the Highland Park plant and two years ago was transferred to the Fordson plant.

Page Succeeds Davock

H. N. Davock has resigned as service manager of Packard Motor Car Co. and has been succeeded by J. F. Page, service manager of the Packard branch in Chicago since 1919. Mr. Davock resigned because of illness. T. A. Stalker will be manager of the factory technical department; B. R. Horsley, manager of the parts department; J. D. Wilson will continue as manager of the accessory department, and H. C. Taylor will continue to handle time studies.

Stephens Back at Factory

H. M. Stephens, general sales manager of Cadillac Motor Car Co., has completed a trip through Midwestern and Southwestern States, covering the major points in Texas, New Mexico, Colorado, Kansas and Missouri. He traveled much of the way by motor car and compared conditions with those he met one year ago.

De Juhasz Takes College Post

K. J. De Juhasz, well-known inventor of a high-speed indicator widely used for testing automobile engines, was appointed to the engineering experiment station of the Pennsylvania State College to carry out researches in connection with Diesel engine development.

Chamberlin Gets N. Y. Post

Clarence D. Chamberlin, trans-Atlantic flyer, has been appointed aeronautic engineer for the dock commission in New York City, to act as consultant on the construction of the municipal airport at Barren Island.

Howard Fisher to Marry

Howard A. Fisher, one of the Fisher brothers, will marry Miss Justine A. Price, daughter of Mr. and Mrs. Lawrence Price of Lansing on June 19th.

Institute Would End Price Discrimination

Forty-one Tire Companies Sign Declaration and Be- come Charter Members

NEW YORK, June 2—Seventy-five representatives of the rubber industry met yesterday in the Hotel Plaza for the formation of the recently announced Rubber Institute. A declaration of organization was signed by 41 of these representatives who became charter members of the institute. The remainder of those present also subscribed in effect to the declaration of organization. The declaration follows:

1—Adherence to law, and particularly to those prohibiting the fixing of prices, the allocation of or discrimination between customers, the allocation of territory and the control of production in restraint of trade.

2—The avoidance of unfair discrimination between customers. To that end, rubber products should be sold only upon prices and terms made by each member acting independently and immediately thereafter publicly announced. No member would be obligated to any other member or to the institute to continue the use of such prices or terms for any period but would reserve the right to change them at will, and would announce any departure from the same immediately that it is made. A manufacturer may charge a higher price for special service or for superior quality without making such higher price a part of the announced schedule.

3—These announced prices and terms should be absolutely net without any form of secret price concession whatever. A price concession in any form whatsoever if employed with one customer is discriminatory unless employed with all customers. If thus uniformly employed it amounts to a general price concession which should frankly take the form of a price reduction. Any possible form of price concession is unethical, except when practiced openly; is discriminatory unless uniformly employed and in any event is wasteful, unbusinesslike and damaging in wholesale competition.

Directors Named by Groups

Fifteen directors were elected from three groups as follows:

For corporations doing a business of \$50,000,000 or more a year—H. S. Firestone, Firestone Tire & Rubber Co.; H. T. Dunn, Fisk Rubber Co.; P. W. Litchfield, Goodyear Tire & Rubber Co.; C. B. Seger, United States Rubber Co., and T. D. Tew, B. F. Goodrich Rubber Co.

For firms doing a business of from \$10,000,000 to \$50,000,000—A. F. Townsend, the Manhattan Rubber Mfg. Co.; F. C. Hood, Hood Rubber Co.; W. O'Neil, General Tire Co.; Samuel Woolner, Jr., Kelly-Springfield Tire Co., and F. A. Seiberling, Seiberling Rubber Co.

For firms doing a business of \$10,000,000 or less—A. Boyd Cornell, Hamilton Rubber Mfg. Co.; E. A. Boyer, American Hard Rubber Co.; Thomas Matchett, Hewitt Gutta Percha Corp.; L. J. Plumb, United States Rubber Re-

claiming Co., and C. S. Dickey, Corduroy Tire Co.

Others who signed the organization declaration were: H. L. McClaren, Ajax Rubber Co.; William F. Pfeiffer, Miller Rubber Co.; G. P. Germain, Dunlop Tire & Rubber Co.; J. P. Gabeline, Standard Ford Tire Co.; F. H. Comey, Falls Rubber Co.; N. Lincoln Greene, Clifton Mfg. Co.; S. S. Miller, Mohawk Rubber Co.; Louis Alexander, Industrial Rubber Corp.; Paul O. Himmebright, Monarch Rubber Co.; J. Schwab, Salem Rubber Co.; F. B. William, Jr., Whitehead Brothers Rubber Co.; L. J. Schott, Northern Rubber Co.; Thomas Morrison, Jr., Murray Rubber Co.; A. L. Schoff, Overman Cushion Tire Co.; J. H. Lambert, Acme Rubber Mfg. Co.; H. R. Young, Combination Rubber Mfg. Co.; J. H. Michelin, Michelin Tire Co.; A. A. Garthwaite, Lee Rubber & Tire Co.; A. H. Canfield, H. O. Canfield Co.; Otto Basten, Sterling Tire Corp.; J. M. Whitehead, Norwalk Tire & Rubber Co.; W. C. Hoover, Cord Tire Corp.; C. E. Pumphrey, Fidelity Tire & Rubber Co.; S. T. Campbell, Aetna Rubber Co.; J. N. Alderfer, India Tire & Rubber Co., and Eberhard Faber, Eberhard Faber Rubber Co.

Lyon Metal Products Merges 2 Companies

CHICAGO, June 4—Lyon Metal Products, Inc., has purchased the Duran Steel Locker Co. and the Lyon Metallic Mfg. Co. The major plants of the company will continue at Aurora and Chicago Heights, Ill., with assembly plants at Jersey City, N. J., and at Los Angeles. Distribution will continue through the organizations of the combined companies.

Officers of the new company will be F. S. Waters, president; H. A. Gardner, chairman; Keith Spalding, vice-president; W. N. Vance, vice-president; C. E. Gerberich, vice-president; B. L. Waters, secretary; H. A. Struck, assistant secretary; W. B. Brown, treasurer; A. W. Lauder, assistant treasurer. J. E. Bales, J. B. O'Connor and R. T. Waters are directors.

Goodyear Suit Dismissed

CLEVELAND, June 2—The refinancing plan of Goodyear Tire & Rubber Co., under which \$60,000,000 of first mortgage 5 per cent bonds were issued to retire bonds, debentures and prior preferred stock issued at 8 per cent in 1921, was upheld this week in Common Pleas Court here, Judge Stephenson dismissing the suit aimed at halting the reorganization program.

Champion Estate \$1,894,489

DETROIT, June 4—The inventory of the estate of Albert Champion, late president of the AC Spark Plug Co., filed in probate court in Oakland county, totals \$1,894,489, all of which goes to his widow, Mrs. Edna J. Champion. The estate has paid an inheritance tax to the State of Michigan of \$100,047.

Financial Notes

Fokker Aircraft Corp. is floating an issue of common stock amounting to 40,000 shares of \$25 par first preferred 7 per cent stock, 20,000 shares of \$25 par second preferred 7 per cent stock and 100,000 shares of no par common stock. Estimated minimum annual business is placed at \$3,000,000, according to W. C. Simmons & Co., who are handling the investment, and they place gross profit at a minimum of \$600,000. Current assets are \$727,535 as opposed to current liabilities of \$70,710. Total assets are placed at \$1,326,210.

National Air Transport Co. has voted to increase its capital stock from \$2,000,000 to \$3,000,000 and to give its present stockholders the right to purchase this new additional stock on the basis of one share of new stock to each two shares of old, as of record June 1. This additional financing is for the purchase of passenger air liners, to add to its equipment of mail planes for use on the New York to Chicago route and for the purchase of 50,000 shares of the recently organized Trans-Continental Air Transport.

Wright Aeronautical Corp., at a meeting of stockholders held May 29 approved an increase in authorized capital from 250,000 to 500,000 shares, and the issuance of 50,000 shares at \$100 a share to stockholders of record June 2. The right to purchase these shares will be given to present stockholders on the basis of one share for every five now held.

McCord Radiator & Mfg. Co. reports net income for the four months ended April 30 of \$253,000 after charges and Federal taxes. Sales for the period increased 18 per cent over the same period last year. The company has completed its new plant at Walkerville, Ont., which will have a capacity of 123,000 radiators a year.

Sparks-Withington Co. stockholders have approved of the plan of recapitalization which includes refunding of \$184,300 of 7 per cent preferred stock, issuance of \$1,000,000 of 6 per cent cumulative preferred and an increase in authorized common stock from 200,000 shares to 400,000.

Triplex Safety Glass Co., Ltd., is offering a part of its 150,000 common stock of £1 par value for sale in this country, and the New York Stock Exchange has admitted to trading receipts issued by the Guaranty Trust Co., against deposit of the Triplex stock in London.

Borg-Warner Merger Operative

CHICAGO, June 6—The organization committee of the Borg-Warner Corp. declared the merger operative June 7. More than 75 per cent of the stocks of the companies merged in the new Borg-Warner company has been exchanged for certificates. Application has been made to list the stock on the Chicago Exchange.

Atwood Builds Addition

ROCKFORD, June 6—Atwood Vacuum Machine Co., manufacturer of body hardware, has started erection of an addition which will add 15,000 ft. of floor space and increase capacity 25 per cent.

Chrysler Not Buying Additional Properties

No Disposition to Attain Mere Size—Will Expand As Market Widens

NEW YORK, June 5—Chrysler Corp. directors, at a special meeting held in New York today, voted to call for retirement on Aug. 6, 1928, the entire issue of the corporation's outstanding 8 per cent preferred stock amounting to 220,937 shares at its call price of \$115 per share and accrued dividends to date of retirement, requiring slightly in excess of \$25,000,000.

Walter P. Chrysler, chairman of the board and president of the Chrysler Corp., today gave out the following statement in reply to rumors regarding future plans of the Chrysler organization following the acquisition of Dodge Brothers, as announced last week:

"In recommending to our stockholders a proposal to acquire the great Dodge Brothers properties we have been actuated by a disposition to benefit both businesses, and also to contribute to the economic efficiency and soundness of the industry as a whole. We have no disposition or ambition to attain mere size or volume. We have no thought of rivalry with existing great companies or combinations. We do not look beyond Dodge Brothers to the acquisition of other properties.

"We see in Dodge Brothers, strong, sound, permanent values which we are confident can be enhanced in active affiliation with Chrysler. We likewise see in the union an expansion and enlargement of Chrysler possibilities. Sound business is not best subserved by endeavoring to outdistance other great manufacturing factors.

To Keep Step With Industry

"The Chrysler business is being built step by step in relation to the capacities of the nation and of the industry as a whole. We shall make no move which will even temporarily lessen the very marked advantages which we enjoy in our capital structure. In other words, if we grow, we will grow according to our financial, marketing and manufacturing capacities—not beyond them, in a straining after domination.

"The most powerful asset in the Chrysler business is still the public attitude toward its products. We do not propose to forget that fact.

"The Chrysler business has grown because the public has approved of its products and methods. It will never try to strike a faster gait than this public approval by mere consolidation, which after all is simply promotion, while the Chrysler business is manufacturing, marketing and service.

"I wish to again reiterate the pleasure with which I anticipate the acceptance by the stockholders of the plan

which was approved by the directing boards of both companies. I wish to again pay tribute to the thousands of splendid dealers here and abroad representing the Chrysler and Dodge products.

"The advantages and economies to be brought about by centralization of control are enormous. Through the best use of the combined facilities and prestige of both companies I am certain that the entire industry will be benefited.

"I feel certain of continued prosperity in the industry because of the great purchasing power of the American public and I anticipate greater expansion abroad due to financial and political stabilization."

Kleiber and Moreland Consider Merger Plan

SAN FRANCISCO, June 2—Negotiations are well under way for the merger of the Moreland Truck Co., Los Angeles, with the Kleiber Motor Co., San Francisco, according to a statement by Paul Kleiber, president of the last-named concern, which is about to complete the most successful year of its long history in the manufacture and sales of trucks in this city.

Mr. Kleiber admitted that he had just returned from conferences with Watt L. Moreland, head of the Moreland company, at Los Angeles; that negotiations had gone beyond preliminary stages, and that if the merger goes through, the Moreland corporation will become the Los Angeles branch of the Kleiber company. "To make a statement further than this would be premature just now," Mr. Kleiber added.

Wright Buys Property

PATERSON, N. J., June 6—Wright Aeronautical Corp. has purchased part of the Cooke Works of the American Locomotive Works to provide for future expansion. The property includes 15 acres of land and several buildings, all adjacent to the present Wright plant. Several departments will be expanded at once but the Wright company issued a statement saying the purchase was not made necessary by its participation in the new Transcontinental Air Transport, Inc.

Manley Offices Moved

YORK, PA., June 6—Effective June 9, the sales offices of the Manley Mfg. Co. will be moved to Bridgeport, Conn., to be housed with the American Chain Co. and other associated companies. The change is for greater efficiency in handling sales matters. The operation of the sales force in the field and of service men will be affected only in that they will be directed from Bridgeport.

Studebaker Adds Cabriolet

SOUTH BEND, June 5—Studebaker Corp. of America has added a regal cabriolet on the Commander chassis listing at \$1,625.

Steel Demand Shows Downward Tendency

Industry Holds Orders and Specifications Strictly to Current Requirements

NEW YORK, June 7—While some quickening in specifications against second-quarter contracts is looked for as the result of announcement by the leading interest (followed by the independents), of a \$1 per ton advance in the third-quarter price for hot-rolled steel bars, slowing down in the steel demand is becoming more and more marked. That there is some doubt as to whether the new 1.90 cents, Pittsburgh, price on hot-rolled bars will stand the acid test of representative sales, is shown by the fact that automotive consumers have been apprised of a continuance of the 2.20 cent, Pittsburgh, price for cold-finished steel bars ordered for third-quarter shipment.

Non-integrated sheet rollers have been offered third-quarter sheet bars at \$34, Pittsburgh or Youngstown.

Motor car manufacturers as well as parts makers are placing orders and specifying in strict accordance with their requirements, very little in the way of large tonnages coming out. Hot-rolled strip steel prices have been reaffirmed for third-quarter, but mills are not so much guided by base prices as by the desirability of specifications involved in individual orders for strip-steel. Third-quarter prices for automotive alloy steels are unchanged from those now in vogue. Bolts and nuts rule steady, with specifications seasonally light.

Pig Iron—With keen competition among sellers, a moderate volume of demand from automotive foundries is still making itself felt. The Michigan price is unchanged at \$17.50 @ \$18.00. Valley foundry iron has given way to the extent of 25 cents, the market now being \$17.00. Malleable continues unchanged at \$17.25.

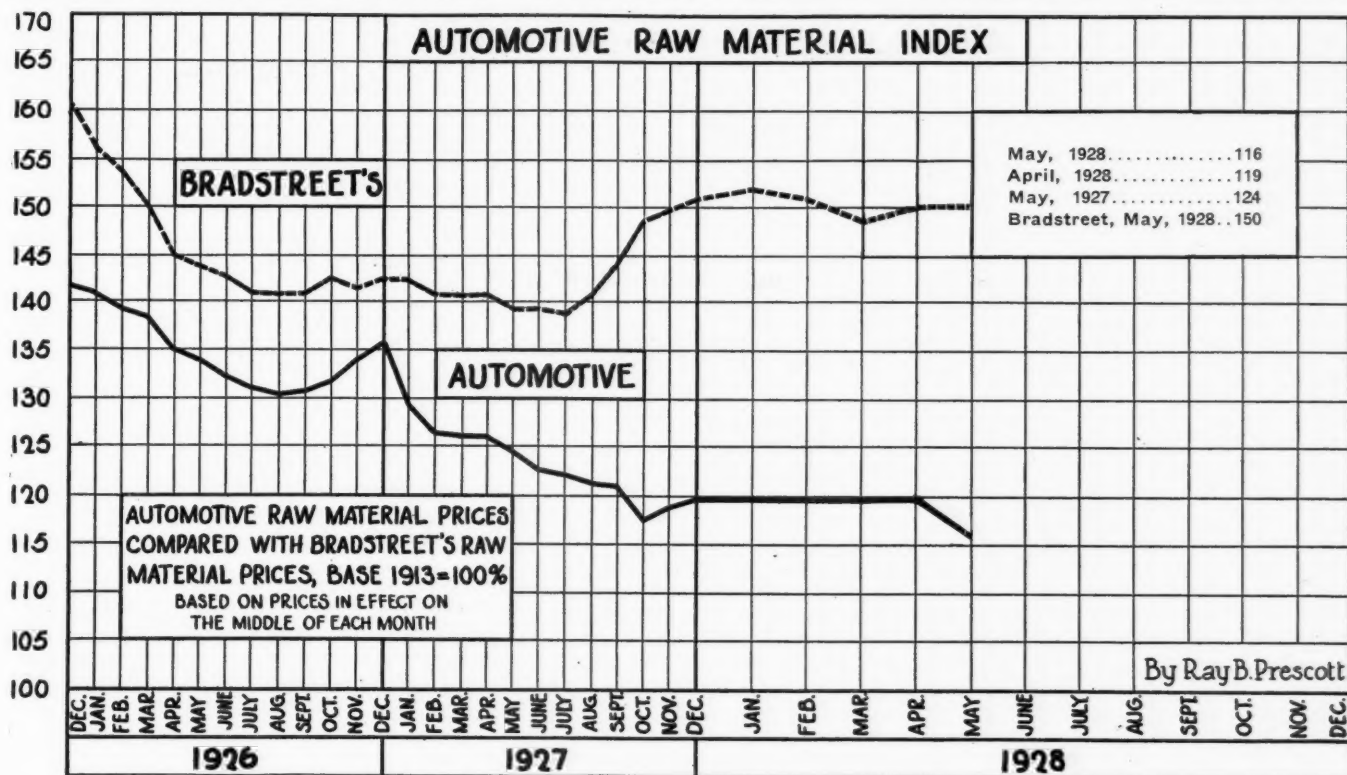
Aluminum—No change in the price situation is noted. Demand for aluminum pistons and reciprocating engine parts continues good. Some automotive consumers are covered for the remainder of the month, but are expected to begin negotiations for third-quarter contracts in the next few days.

Copper—Following the advance to 14½ cents, delivered Connecticut, the market turned more quiet. Producers are not selling futures to any but regular consuming customers, so as to eliminate later competition from second hands. Casting copper is firm at 14½ cents, f.o.b. refinery. Buying of automobile brasses is largely a hand-to-mouth affair.

Tin—An increase of more than 2000 tons in the world's visible supply has had an unfavorable effect on the market, prices below 50 cents making their appearance for the first time in four years.

Lead—The market's tone is firm. Storage battery manufacturers have taken on fairly good-sized tonnages in the last few weeks.

Raw Material Prices Fall Three Points



Rubber Dumping Threat Makes Trading Desultory

NEW YORK, June 4—Reports of accumulation of crude rubber on the estates are coming from London with increasing frequency, according to F. R. Henderson Corp. Some of these reports place the accumulation at approximately 100,000 tons which will be free for shipment Nov. 1, but the Henderson company believes these figures to be exaggerated.

They point to the fact that growers must be aware that the dumping of such an amount of rubber on the market on Nov. 1 must inevitably reduce prices to such an extent that profits would be highly problematical. These rumors, however, continue to cast a pall over the market and trading is rather desultory, with consumers buying on a hand-to-mouth basis.

London stocks continue to decline with a record reduction made for the week ended May 26 of 4077 tons, bringing the total down to 44,628 tons.

Arrivals at all ports of the United States for the month of May are estimated at 29,300 tons.

Central Alloy to Expand

CANTON, OHIO, June 2—Erection of 15 coke ovens and building of a 500,000 cu. ft. gas holder, costing approximately \$600,000, is expected to be started within 10 days by the Central Alloy Steel Corp.

20 Ford Plants Now Active

DETROIT, June 2—Ford Motor Co. now has 20 plants in the United States in operation, 10 of which began pro-

duction activities since April 1. The company said that while production is being pushed forward, that Ford dealers have been given a complete course of instruction in the new models. A plan which involved the training, in Ford plants, of dealers and mechanics, has been under way, and more than 11,000 men have been trained.

Casing Sales Up 8,850,000, Inner Tubes Show Drop

WASHINGTON, June 7—Evidence that inner tubes last longer in low-pressure balloon tires is seen by the Automotive Division of the Department of Commerce in figures compiled recently showing that while sales of casings have steadily increased during the last three years, those of inner tubes have remained practically stationary. The department announces sales of 45,929,000 casings for the year ended April 1, last, an increase of almost 8,850,000 over the corresponding period of 1927. Figures for inner tubes show sales for the year ending April 1 amounted to 55,251,000 as compared with 55,270,000 for the year preceding.

Tire dealers sold 1.49 inner tubes on the average with each casing during the year ended April 1, 1926; 1.33 tubes per casing in the next year, and 1.20 inner tubes per casing in the last year.

A. O. Smith at Capacity

MILWAUKEE, June 2—With approximately 4500 on its payroll, the A. O. Smith Corp. has increased its production forces during the past week. The automobile frame department is running full blast.

Heil Company Absorbs Hydro-Hoist, Subsidiary

MILWAUKEE, June 2—The Hydro-Hoist Co., a subsidiary of the Heil Co., has been consolidated with the Heil Co. by an exchange of stock. In place of the \$200,000 capital of the Heil Co., and \$100,000 capital of the Hydro-Hoist Co., there is now an authorized issue of 75,000 shares of no-par value common, of which 59,892 shares, valued at \$1,700,000, are outstanding. Julius P. Heil, founder of the business, has been elected president and treasurer, Clement C. Smith, Milwaukee capitalist, becoming chairman of the board. Mr. Heil formerly was vice-president, treasurer and general manager. The plant occupies 18 acres, giving room for doubling its size.

Martin Trailer Reorganized

SPRINGFIELD, MASS., June 4—Martin Trailer Co., formerly of this city, has been reincorporated and has leased a plant in Westfield for the production of trailers and the fifth wheel device employed to steady the operation of the combined truck and trailer. Complete units of the trailer and fifth wheel will be produced extensively. Howard E. Swift is president.

Oldsmobile Employing 6235

LANSING, June 2—Employment at the Olds Motor Works is at the highest point in history. There are 6235 workers on the payroll and the employees are averaging from 11½ to 12½ hours per day. The figure includes the Olds Motor Works and the Olds division of the Fisher Body Corp.

Practical Program for Service Forum

DETROIT, June 5—Announcing the complete program for the Service Managers' Forum of the National Automobile Chamber of Commerce to be held at the King Edward Hotel, Toronto, June 18-19, Charles D. Hastings, Chairman, characterized it as "one of the most practical ever prepared." The program follows:

How the Factory Can Help the Dealer Improve His Service, by A. K. Steigerwalt, Durant Motors, Inc.; Installing Flat-Rate and Service Selling, by H. M. Wiegand, Dodge Brothers, Inc.; Service Parts Marketing, by A. R. Sandt, General Motors Corp.; Specialization in Maintenance, by F. A. Oberhue, United Motors Service, Inc., The Profitable Use of Shop Equipment by L. Z. McKee, Weaver Mfg. Co., Economic Packing of Parts for Shipment by Charles J. Zusi, Container Testing Laboratories; Human Element in Service, by H. B. Lewis, Commercial Credit Co.; Scientific Brake Testing and Adjustment, by F. W. Parks, Cowdrey Brake Tester Organization; Service Operations of General Motors of Canada, by C. E. McTavish, General Motors Products of Canada, Ltd.; Maintenance Work of the Toronto Transportation Commission, by A. S. McArthur, Toronto Transportation Commission; Handling Export Service, by J. L. Kenyon, Chrysler Corp.

G.E. Improves Arc Welding

NEW YORK, June 2—General Electric Co. has improved its control equipment for use in arc welding by stopping the feed of electrode wire a short time before shutting off the welding current at the end of the weld. This serves a double purpose of clearing the electrode from the weld and of filing in the crater.

Coming Feature Issues of Chilton Class Journal Publications

June 10—A. E. A. Summer Meeting Number—Motor World Wholesale

June 23—Engineering Issue—Automotive Industries

Oct. 10—Marketing Annual for 1929—Motor World Wholesale.

Stinson Aircraft Builds

Large Paint Spray Booth

DETROIT, June 4—What is said to be the largest paint spray booth in the world is being constructed by the Stinson Aircraft Corp. on its Northville airport. It is 50 ft. square and 12 ft. high, of all-metal construction and equipped with the very latest ventilating and heating devices. By means of wind-blown, water-filled apparatus located about the structure's walls, both the temperature and humidity within the building can be kept at favorable marks regardless of weather conditions outside.

The field paint shop will be capable of housing a complete airplane, and painting of the craft can be completed within three hours, it is said. Upon completion of the spray booth all painting work now done in the Stinson plant in Northville will be done on the field.

Buy Flint Speedway Site

FLINT, June 4—A 443-acre site east of the city has been acquired for the Flint Speedway-Airport. It is planned to build a two-mile concrete track for automobile racing while the infield will be utilized as a flying field. The site is accessible to several railroads and is also located on two main highways.

Argentine Projects Super-Highway Link

NEW YORK, June 6—A. M. deTonnay, managing director of General Motors Argentina, S. A., who sailed Saturday on the S.S. Vauban after a two months' visit to the United States and Europe on business for his company, told of a projected super-highway from Buenos Aires to Rosario at a cost of about 15,000,000 pesos.

This highway will form the first link of a system of super-highways in South American republics. Rosario is 350 miles from Buenos Aires and is known as the city of millionaires. The development of highways will greatly accelerate a great economic development which the Argentine is facing today, in Mr. deTonnay's opinion.

"We have a group of automotive interests who are prepared to underwrite the cost of the highway," he said, "provided the government will authorize the project. It is proposed to separate automobile traffic from mixed traffic and the entire roadway would run through the center of a parkway. Grade crossings would be avoided. The underwriters would be repaid within 15 years and would be allowed a nominal interest on their investment under the proposed plan."

Poland Triples Road Fund

WASHINGTON, June 7—Poland expects to spend the equivalent of \$9,000,000 on highways and bridge construction improvements during the next fiscal year, according to budget allowances already provided, the Department of Commerce is advised by Assistant Trade Commissioner Redfern at Warsaw. During the last fiscal year the appropriation for such work amounted to the equivalent of \$3,410,000.

Calendar of Coming Events

SHOWS

American Electric Railway Ass'n, Public Auditorium, Cleveland...Sept. 22-28
American Road Builders Association, Inc., Cleveland Auditorium...Jan. 14-19
American Society for Steel Treating, Commercial Museum, Philadelphia...Oct. 8-13
Automotive Equipment Association, Coliseum, Chicago...Oct. 22-27
Berlin...Nov. 8-18
Brussels...Dec. 8-19
*Chicago...Jan. 26-Feb. 2
International Aeronautical Exposition, Grand Palais, Paris...June 29-July 15
London, passenger cars...Oct. 11-20
National Standard Parts Association, Cleveland Auditorium...Oct. 29-Nov. 3
*New York, Grand Central Palace...Jan. 5-12
Paris, passenger cars...Oct. 4-14
Paris, trucks...Nov. 15-25
Prague...Sept. 1-9
Radio Manufacturers Assn., Inc., Stevens Hotel, Chicago...June 11-15
Salon, Automobile Salon, Inc., Hotel Drake, Chicago...Jan. 26-Feb. 2
Salon, Automobile Salon, Inc., Hotel Biltmore, Los Angeles...Feb. 9-16
Salon, Automobile Salon, Inc., Hotel Commodore, New York...Dec. 2-8
Salon, Automobile Salon, Inc., Palace Hotel, San Francisco...Feb. 23-Mar. 2

* Will have special shop equipment exhibit.

CONVENTIONS

American Automobile Association, Bus Division Meeting, Cincinnati, June 27-28
American Automobile Association, Annual Meeting, Cincinnati...June 28-29
American Electric Railway Ass'n, Public Auditorium, Cleveland...Sept. 22-28
American Gear Manufacturers Association, Statler Hotel, Buffalo, N. Y., Oct. 11-13
American Road Builders Ass'n, Inc., Cleveland Auditorium...Jan. 14-19
American Society for Steel Treating, Commercial Museum, Philadelphia...Oct. 8-13
American Society for Testing Materials, Chalfonte-Haddon Hall Hotel, Atlantic City, N. J. ...June 25-29
Automotive Engine Rebuilders Association, Coronado Hotel, St. Louis, June 11-14
Automotive Equipment Association, Grand Hotel, Mackinac Island, June 17-23
Automotive Equipment Association, Coliseum, Chicago...Oct. 22-27
National Association of Automobile Show and Association Managers, Before-Shows, Drake Hotel, Chicago...July 26-27
National Association of Credit Men, Hotel Olympia, Seattle, Washington...June 11-16

National Automobile Chamber of Commerce, Service Managers' Forum, Toronto...June 18-19
National Safety Council, National Congress, New York...Oct. 1-5
National Standard Parts Association, Hollenden Hotel, Cleveland, Oct. 29-Nov. 3
Overseas Automotive Club, Luncheon, Hotel Astor, New York...June 14
Radio Manufacturers Assn., Inc., Stevens Hotel, Chicago...June 11-15
Society of Industrial Engineers, Rochester, N. Y. ...Oct. 17-19
World Motor Transport Congress, Rome...Sept. 25-29
A. S. M. E.
Cincinnati, Oct. 22-25—Machine Shop Practice.
Cleveland, Sept. 17-20—Fuels.
Detroit, June 28-29—Aeronautic Division.
State College, Pa., June 14-16—Oil and Gas Power.

S. A. E. National

Quebec, Chateau Frontenac...June 26-29
RACES
Altoona...June 16
Belgium...Aug. 12
France...July 1
Germany...July 15
Great Britain...Sept. 22
Italy...Sept. 2
Spain...July 29